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EDITORIAL NOTES.

The First Conference.

THREE weeks from to-day, the British Commercial Gas Association will be holding its first annual conference in Manchester, under the presidency of Mr. Corbet Woodall. This inaugural event promises to be a huge success; and truly every contributory cause that can make it so is being brought to bear. The civic dignitaries of Manchester and Salford count it more than a passing honour that their opulent and world-famed industrial areas should constitute the venue for the first annual conference of an Association representing the commercial side of such an imposing industry as that of gas supply. The Gas Committees of the two Corporations, and especially Mr. Councillor W. Kay, the Chairman of the Manchester Corporation Gas Committee, and Alderman F. S. Phillips, J.P., Deputy-Mayor of Salford, and Chairman of the Gas Committee of the borough, with the chief officers of the departments, have been working with zeal to make the occasion as lustrous and profitable as possible to the Association. The delegates will be welcomed by the Lord Mayor of Manchester (Mr. Councillor S. W. Royse) and by the two gentlemen already named, and will receive hospitality at the hands of both Gas Committees. All this will constitute a dignified recognition of the services of the new organization to the gas industry and to the community generally.

At the offices of the Association, preparations for the event have been actively proceeding, under the direction of the Chairman of the Executive Committee (Mr. F. W. Goodenough) and his colleagues, who have found the Secretary (Mr. W. M. Mason) and the other permanent officers worthy lieutenants in arranging the details. In addition to the address of the President, there will be four papers read and discussed at the conference. The voice of Professor Vivian B. Lewes will be heard in an evening lecture, on "The Hygiene of Gas," to which the civic hosts and the leading architectural, educational, scientific, and medical authorities of the district will be invited. Then Mrs. M. A. Cloudesley Brereton will probably have something to say pertinent to the objects of the work of the Association to the local ladies who will be attending a reception by the Lady Mayoress.

The social side of the occasion will enhance the attractions of this first annual meeting of the representatives of those who have so much at heart the interests of the industry that they are promoting those interests through material co-operation—believing that the advancement and protection of industrial interests represent work that has not such limitations as (say) the borders of any individual gas-supply area. In addition to the luncheons by the Manchester and Salford Gas Committees on succeeding days, the first annual dinner will be held on the evening of the first day; and at this dinner, the President is hoping to welcome the Lord Mayor and members of the Manchester City Council, the Mayor and members of the Corporation of Salford, as well as several of the leading local representatives of the various professions already mentioned. Co-operation in the organization of the conference, and of the events associated with it, will do much to advance recognition of the Association and of the value of its work. It is all in keeping with the objects of the new body.

A Public Danger.

PROMINENT collapses of the supply of electric current have been somewhat frequent of recent times; and they bring to the front the important question of public safety in relation to electricity supply. There was the quite recent breakdown on the tube railways; and among some other modern incidents of the kind, in which there was cessation of the public supply, are those at Liverpool and Glasgow. A supplement was provided by Islington on Monday night of last week; and this one accentuates the public danger by the variety of the places frequented by the public of their own free will, or occupied by members of the community through bodily affliction or by merited durance, in which there was sudden failure of the means of lighting. With the extensive witness that the country has to the propensity for electric lighting to abrupt and wholesale extinction through causes some of which are veritable trifles, it ought surely to be regarded as being part of the duty of our responsible local governors and the authorities of public institutions and places of entertainment and assembly to protect the community against these known contingencies. On the contrary, they treat the fact of unreliability with supreme indifference and irresponsibility. There is no doubt that this attitude is largely encouraged and developed by the municipal control of the electricity supply of the country, and to the inter-connection, through the *personnel* of the governing bodies, of the management of our local affairs. institutions, and services. If this is so, then Parliament ought surely, in the public interests, to exercise some restricting power and regulation.

Here at Islington, the Borough Council have control of the electricity supply in 4¾ square miles of a populous part of the Metropolis. What is the result of this? The greater part of the streets are lighted electrically, and so are most of the local institutions—including local prisons and hospitals. A fault on the main switchboard at the generating-station, on the evening mentioned, caused cables to fuse, and a fire (fortunately of not large dimensions) at the station. This was fatal to all points of electric lighting throughout the borough. Every street, theatre, and music hall, hotel and restaurant, shop, prison, hospital, and dwelling-house relying upon the supply of current for lighting was precipitately thrown into darkness. This is not the first experience of the kind at Islington. There was a similar occurrence at the same generating station in 1902; and great inconvenience was then experienced. Yet the Borough Councillors have since largely displaced gas lighting in the streets, which means of lighting had never failed them; and by their local influence they have caused electric lighting to supersede gas lighting in several other important public establishments. On Monday night last week, tram cars, motor-buses, and other traffic had to proceed through the darkened streets at a crawling pace; extra police had to be drafted into the district for the protection of life and property; at the Great Northern Hospital, the doctors were making their last inspection for the night, and neglected gas-lights had to be hurriedly made available; at Pentonville Prison the corridors only were lighted by gas, and the authorities had hastily to improvise crude makeshift lighting so as to keep prisoners under observation; at Holloway Prison there was also trouble; at the Northern District Post-Office, the mails had to be made up by candle light. All these are public services and institutions, which ought not to be subject to this sort of thing by the supersession of a reliable by an unreliable source of light—at any rate, without proper and adequate provision being made for such emergencies by the responsible authorities.

The same applies to those who are responsible for the conduct of theatres, music halls, picture palaces, and other places of public assembly. The London County Council have certain regulations as to duplicate systems of lighting for such places. It would be interesting to know why it was that, of five of these places, two had to close their doors. The Islington Empire generates its own electric current; and it was not affected. The Marlborough Theatre had an old gas chandelier that was brought into use; and the Holloway Theatre had some gas "head-lights" that were requisitioned. If the public are to be protected, the duplicate system of lighting should be an efficient and sufficient one, and should be maintained in the best order for emergency. It is not the slightest use having these lighting regulations and provisions for safety, if they do not in reality provide

for a thorough alternative system. The London County Council ought to look into this matter. It is one of considerable importance; and Islington emphasizes it. Hotels and restaurants ought also to be brought under similar regulation, though, of course, in them there is not in many cases the same density of patronage as in the case of places of entertainment such as theatres, music halls, and picture palaces. At the same time, there are hotel dining-rooms and restaurants which are largely crowded throughout the evening. As to tradesmen and private householders who rely solely on electric lighting, they come in a different category, and are at liberty to follow their own inclination in this matter. Islington tradesmen with candles and oil-lamps and oil for sale found their stocks beautifully less last Tuesday morning, and their tills overflowing. "It's an ill wind that "blows nobody good"—the Gaslight and Coke Company among others.

The safest, most reliable, and most efficient lighting agent is gas; and our public authorities know it. It is the public aspect of this question that is most important. In electricity supply, there is no certainty of continuity. But municipal possession of this service has the effect of blunting conscientious regard for the provision of the best protection for the public whose interests our governing authorities are appointed to serve. There is in this a wanton dereliction of civic duty.

Gas Turbines and the Diesel Engine.

THE paper that Dr. Dugald Clerk read at the meeting of the British Association leaves in a greater state of hopelessness than before those who have been looking to the gas-turbine proving an economic and practical success. He examined the position in the light of the latest data at disposal; but the result is that, despite the ability and courage displayed in experimental work, and the money expended, there has been no practical achievement. True there is some value in the new data that the work has placed in the possession of those interested in the complex problems that obsess progress in this line, but nothing of real practical and commercial value. From Dr. Clerk's review of the position, it is clear that there are only two directions from which can come relief from the *cul de sac* in which the gas-turbine finds itself—either absolutely new lines must be discovered for the development of a rotary gas machine the equivalent of the steam-turbine; or, if the present lines are adhered to, some new material must be unearthed that will stand the temperatures and mechanical strains to which the experimental turbines—and more especially the blades—are continually exposed. It is quite patent that nothing so far has been discovered that will minimize in a satisfactory way the effects of the temperatures without bringing other depreciating influences into action. Therefore the experimentalists are still left with the temperatures, and with the devout desire that someone may hit upon the material that will resist the temperature and other hardships to which the existing gas-turbine structures are exposed. But those who have scanned the horizon for the coming of such a material do not yet find any hopeful indications. There are vague references, however, going the round as to Mr. Ferranti being at work on a gas and steam turbine; but no information is yet available as to the measure of his success. Incidentally, in replying to the discussion, Dr. Clerk had a little dig at the Diesel oil-engine enthusiasts, who talk as though, with an eye probably on financial developments, the engine is carrying everything before it. He pointed out that at one works alone more gas-engines were being turned out in a single year than could be boasted by the Diesel engines ever since their manufacture began. Dr. Clerk spoke of the unreliability of the fuel costs for that type of engine; he might also have emphasized the relatively heavy wear and tear and labour charges, including depreciation and replacements through premature or natural disablement.

Automatic Lighting and Service Governing.

THE papers read at the North British Association meeting, and published in our last issue, were of the practical nature that induces men to think over the subject-matter. Theory and abstract propositions and considerations are generative of thought, and often ultimately of practice; but such stimulants of the intellect do not appeal to such a large circle of men engaged in manufacture and commerce as does concrete experience. There was such experience in the paper by Mr. George Keillor, of Broughty Ferry, on "Automatic "Street-Lamp Lighting and Extinguishing." It is a matter that has now passed the experimental stage; and, though the adoption of one system or the other of accomplishing the same end is of gradual growth, the automatic lighting and extinguishing of street-lamps has taken its place finally and surely among the practical methods of the gas industry. The day will come when, in every city and town, the lamplighter and his torch will be considered but a primitive and crude system of manipulation. That is a bit prophetic; but we have no more hesitation in writing the words to-day than the "JOURNAL" writer—long since passed to his rest—had 35 years ago in writing the words of which Mr. Keillor reminds us: "To-day, it [the automatic operation of street-"lamps] is little more than a dream." The fact that those words were written so long since shows the slowness of the growth of the idea; but now the gas industry is being spurred on in the matter from three quarters. In the first place, it must be admitted that it is not the business of the gas industry to allow the competitors to have a single advantage which cannot be equalled, if not excelled. The quality and the distributing and penetrative powers of the light of incandescent gas-burners are more than countervailing advantages of the lighting and extinguishing ability possessed by our electrical friends. Irrespective of financial and other considerations, there can be no denial that it is a very pretty sight to see at dusk a whole street lit up simultaneously. The second spur is found in the invention, improvement, and production of the appliances that constitute the various automatic gas lighting and extinguishing systems. If inventors and manufacturers had not confidence in the ultimate supremacy of automatic lighting and extinguishing over the crude method of the man and the torch, they would not spend so much time and money upon the appliances and their exploitation. The third spur is successful practical experience; and of a goodly and seductive amount it has now become.

Problems surrounding the devising of practical systems have been many; difficulties have been great. But one by one they have been surmounted, as are any new ones that crop up under the divergence of local circumstances. The road has been a long one to the present position; but small, piecemeal, and unsystematic experiment, and, on the part of those in public lighting authority, a disposition to mistrust mechanical operation, and to approach it with prejudice—looking for weaknesses to confer condemnation, instead of ascertaining them with a view to their elimination—have been among the causes that deferred present achievements. Yet another retarding cause has been that, in some of the earlier cases of application, the process has not been applied systematically; and this is particularly so with the pressure-wave systems. In these the appliances must be adjusted to work at a pressure in excess of the maximum pressure in any part of a district; otherwise there is bound to be trouble, as there has been, by the lighting-up of lamps during hours of daylight. If what Mr. Keillor did before he applied the "A & M" pressure-wave system to the 650 lamps in his district had been done in those earlier trials, there would not have been the vexation and mistrust that were created by unwelcome happenings. He made a special and preliminary pressure survey of his district to find out the maximum district pressures; and now, by the aid of a Bryan-Donkin pressure-raising plant (the operation of which is simplicity itself), he maintains a perfect control over his automatic lamp lighting and extinguishing, as is now the case in other of the systems of the same class that have been under extensive trial. Mr. Keillor described the various systems—the clockwork or the unit system, and certain of the pressure-wave systems. The great point of his experience is that, though he has not been at work long enough to specifically state what are the financial advantages, he is more than satisfied with them, and with the operation of the system and the appliances, and with their value as a means of promptly giving light on foggy and dark days.

There are several details around which there is usually discussion when touching this subject of automatic lighting. One is the effect upon the lighting consumers' burners and all other appliances of temporarily increasing the pressure. Mr. Keillor has been working with 4½-inch pressures for eighteen months for automatic lighting and extinguishing purposes—1½ inches above normal. But do consumers complain? Not a bit of it. As a matter of fact, the temporary increased brilliancy of their incandescent burners has induced them, like Oliver Twist, to ask for more. The difference in pressure may not temporarily be of advantage

for gas fires and cookers. This, however, links up with the larger question of consumers' governors, which was dealt with in a paper by Mr. Carmichael Peebles, treating generally of governors. This is a subject that has been discussed more frequently lately; and with the extension of the applications of gas, and the varied pressures required in industry, and for high-pressure lighting, the simplification of distribution will undoubtedly end in the governing of the gas consumers' services to the requirements of their individual houses and industrial establishments. This is already a matter of practical politics in gas-supply administration; and the fact that service would be improved by governing under any circumstances, removes from the pressure-wave method of automatic lighting and extinguishing the charge of necessitating governing as an essential auxiliary of the system. As a matter of fact, where the pressure-wave system is extensively in use, there has been no general application of consumers' governors, though their application would be an indisputable advantage. In this connection, we rather sympathize with the view of Mr. Peebles, that the time has arrived when a tentative standard for private consumers' pressures might be adopted, so as to simplify the work of the governor makers. Such pressure standardization for private houses would doubtless produce some advantage for the large purchaser of governors. Mr. Peebles' idea is that, if 25-10ths or 30-10ths were adopted as a standard for a few years, this would be a great step on the road to supply improvement. The 30-10ths would certainly cover the present domestic uses of gas—for lighting, heating, and cooking.

Reverting to the question of automatic street lighting, Mr. W. R. Herring, when in Edinburgh, on financial grounds found the pilot-jet to be a difficulty in the path of adoption with the low-consumption inverted gas-burners of the public lamps. There is, however to the credit of the system the economy in gas effected by the simultaneous igniting and extinguishing of street-lamps, and the savings in mantles. Naturally, the pilot-jet is a charge against the system; but the fact remains that in most places there is found a good counterbalance to the pilot, though not perhaps to the same extent in the low-consumption inverted burners using high illuminating quality gas such as is distributed through the area of the Edinburgh and Leith Gas Commissioners. Automatic lighting and the governing of consumers' services are well among the industry's movements in practical development.

Public Lighting Details.

THE paper that Mr. S. B. Langlands read at the meeting of the North British Association (p. 699) has likewise a practical value, in that the details he brings forward are those that, in his large experience in Glasgow, he finds of value in getting the best possible out of the street lamps under his command, and in improving their lighting duty. We wish that more of those responsible for public lamp equipment and maintenance had as conscientious regard for small details. It is those who neglect them who have the greatest difficulty in keeping their end up when the time of contest for a new contract comes round. This applies not only to lighting during the run of a contract, but to lamps put up for trial purposes for determining relative values. Unless they are properly installed and "tuned-up" by competent men for the work they have to perform, and not treated merely as a rough piece of mechanism that can be set to work in any slipshod manner, it may mean the loss of an entire contract for public lighting, or, at any rate, a large slice of the lighting. For those who are heedless of detail in public lighting, a day of reckoning is bound to come; and laxity in attention and indifferent lighting are always remembered when the time arrives for the consideration of the offers of competitors. We can see that, if Mr. Langlands has a fairly free hand, his quest for perfection in detail will result in Glasgow obtaining notoriety for its good lighting among the local authorities of the country.

Mr. Langlands speaks of the duty that he derives from the Kern burner, under Glasgow conditions, as 18 candles per cubic foot, and from the inverted burner as 21 candles per cubic foot. In public lighting, we shall soon have to discontinue appraising the efficiencies of burners in this fashion, and advance to measurement that tells us something more about the efficiency of burners for the purposes to which they are applied. The mere statement of the candle power of the source measured on the horizontal plane is interesting, but really of little value for lamps to be used for large space illumination—such as streets. The difference between the candle power of the two burners as presented by Mr. Langlands is over 10 per cent.; but with a bundle of the light rays of the one tending upwards, and a greater proportion of the light rays of the other tending in the opposite direction, the values of the burners have a distinct difference in street lighting which is not disclosed by the mere statement of the horizontal candle power. This, of course, is all fully appreciated at Glasgow, as is testified by the gradual adoption of inverted burners. There is no doubt that there will be further invention in the production of reflectors that will enhance the already good distribution power of the inverted burner for street illumination; but, as it is, there is nothing to surpass it to-day. We cannot, however, see in what way it will ever be possible to carry out Mr. Langlands' suggestion of putting a reflector into the bottom of a lantern to catch up the falling rays, and throw them out on the horizontal plane, without causing an unpleasant shadow beneath the lamp.

In other ways, Mr. Langlands seeks to, and succeeds in, materially raising efficiency. Mathematical precision as to sizes of gas nipples, areas of air ports, and length and diameter of nipples are of importance; but as to the "elaborate" tests that were made to secure these refinements suited to Glasgow conditions, Mr. Langlands gives no information. It might be serviceable to others if he would do so. Lantern construction and mantle consumption also come under consideration in the paper, the author of which does not spare mantles in attaining his efficiency ideals. But with inverted burners there is a reduction under this head, as there is not the destruction by fraying brought about by the mechanical contact of mantle with burner head as in the case of the upright burner. The paper is a useful one in the matter of the advice it contains, if only the advice is followed.

Results from a Small Vertical Retort Installation.

A SHORT paper, but a useful one, was presented at the same meeting by Mr. W. Blair, on his further experience with the two settings of eight Glover-West retorts at Helensburgh Gas-Works. Mr. Blair in his additional experience has had under trial a variety of coals in the continuous verticals; and he finds that the retorts readily respond to the variations of speed at which the different coals should pass through, to secure proper carbonization and gas and coke results. The coke is especially improved, and has a higher commercial value. The installation has been running about fourteen months; and the retorts are in good condition, which promises well on the score of wear and tear. The results that Mr. Blair gives show that the investment in the installation has been a good one. With an increased make of 2400 cubic feet per ton of coal, more tar and liquor, and a considerable reduction in costs per ton, compared with the horizontal retort working, he has ground for agreeable reflections over the fact that he saw that, even a comparatively small sized works, could indulge profitably in vertical retort working if there was a preference for this system. Regarding the higher make of gas per ton of coal, the aggregate result of this is seen in the production of 68,755,000 cubic feet from 5779 tons of coal, compared with 59,902,000 cubic feet from 6201 tons carbonized in the horizontal retorts. There is one point about the coke. The quantity of coke sold per ton of coal carbonized is shown to be greater in the case of the horizontals than in that of the verticals; but the fuel account is about 12·5 per cent. higher in the case of the former than in that of the latter.

Gas Companies' Regulation Bill for New South Wales.

In another part of the "JOURNAL" will be found an outline of the provisions of a Bill for the regulation of gas companies which is now before the Legislative Council of New South Wales. We have used the word "regulation," but one of the local papers employs much stronger terms—"confiscation" and "destruction." As introduced, it applies to only three Companies—the Australian, the North Shore, and the Newcastle; so that the other seventeen or eighteen companies, as well as the undertakings in the hands of municipalities, are exempt. It will be seen that the provisions of the Bill relate to testing the quality and pressure of gas, the raising of capital, and the payment of dividends. The illuminating power is to be 16 candles consumed at the 5 cubic feet rate; and heavy penalties are to be incurred for deficiency—

£2 for the first half candle, and not less than £25 nor more than £100 for the first and every subsequent candle. It is the financial portion of the measure that has aroused the greatest consternation; and the effect of the publication of an epitome of the Bill caused a fall of £3 in the shares of the Australian Gaslight Company, representing about £425,000. The Company have been paying 15 per cent. dividend; but this is cut down at a stroke to 4 per cent. with a sliding-scale of 5s. per cent. for each 1d. reduction of the standard. This is equivalent to telling the Company that if they wish to continue to pay their customary dividend they must supply gas at 1d. per 1000 cubic feet! The proposition is indefensible. As pointed out in the local Press, if there had been a full inquiry, and it had been found that the Company could pay their present dividend on a charge of 3s. 6d. per 1000 cubic feet, it might be argued that it would be fair to standardize the rate of dividend on this charge. But there has been no inquiry; and the Bill containing this arbitrary provision is denounced as one which "blackens the fair fame of the State." Other features of the measure to which attention may be called are the powers given to the Minister in connection with the application of the money in the special purposes fund to be constituted under the proposed Act; also the creation of a divisible profits account. Two of the Companies specially named are at the present time in need of additional capital; but what prospect have they of getting it with such a measure hanging over their heads as the one under notice? As shown by the remarks of the Chairman at the meeting of the Australian Gaslight Company reported in the "JOURNAL" a fortnight ago, the Company's progress is at present impeded by the position of affairs. If the Bill should pass, which it is to be hoped it will not—at all events, in its present form—they and other companies in the State will suffer severely. The object of the Bill is considered in some quarters to be to force the gas undertaking into the hands of the Municipalities.

National Oil Supply and Carbonization.

There has been some concern expressed in the columns of "The Times," in view of the growth of the use of oil as fuel, as to the position in which this country would be—say, in the time of war—if relying exclusively upon imported oil. In an hour of patriotic fervour, Mr. W. R. Herring wrote to "The Times" to explain that there is no need to rely on imported oil. This is why: At one time the gas industry used to have recourse to cannel coal for the enrichment of gas. The circumstances of the time and a benevolent Parliament made enrichment by means of cannel no longer necessary. Therefore, the beds of that commodity are now lying in Mother Earth's store disregarded. Why should not the country avail itself of them—dealing with the cannel in vertical retorts, which lend themselves to considerable gradations of temperature, whereby the cannel can be treated first to a very low temperature at the top of the retorts, until it reaches a high temperature at the bottam—the oil and volatile matters being distilled off in the region of the low temperature and the final gas and ammonia compounds in that of the high temperature? The suggestion is an excellent one. It was, however, one of the arguments of the high illuminating power abolitionists that the exhaustion of the reasonable priced cannels was one of the grounds for asking that lower illuminating powers for town gas should be imposed. Now on those cannels Mr. Herring suggests we should largely rely to make us independent of imported oil. Can he tell us the extent of the workable cannel beds, and the probable length of time that it would take to exhaust them in the event of the country having to depend upon them exclusively for a supply of oil equal to the present consumption? We are only making the inquiry on a supposititious case, because there must be some foundation for an estimate.

Coal from Nova Scotia.

The references by the Chairman of the South Metropolitan Gas Company (Mr. Charles Carpenter) to the importation of coal by the Company from Nova Scotia, America, and Germany during the coal strike has spread interest much beyond the limits of the proprietary to whom the information was addressed. As was to be expected, there has since been a revival of proposals to land coal in the Thames for gas making from Nova Scotia; and an ingeniously worded paragraph has appeared in London and provincial papers bearing upon the subject of a so-called "offer" to the South Metropolitan Gas Company and the Gaslight and Coke Company to supply them with all the coal they require at a less price than they are now paying to the colliery owners in the North of England. The ability to do this is based upon three reasons: By the use of coal-cutting machinery, by carbonizing the surplus coal raised for the production of "oil, sulphate of ammonia, and coke," and by the employment of a new type of collier, by which coal would be conveyed at 1s. 3d. per ton. We do not know whether this wonderful offer has any association with the speeches made by Mr. E. Kimber in 1909 at meetings of the Gaslight and Coke Company and of the South Metropolitan Company; but the high colours of the statements in the newspaper paragraphs fade somewhat when we ascertain the precise position. From Mr. Carpenter we learn that it is quite true a suggestion has been made that the South Metropolitan Company should interest themselves in a coal-field in Nova Scotia, and that the financial responsibility they were asked to undertake was less than a million—not a large sum as coal-fields go. The coal the Company had from Nova Scotia during the strike was very good; but there is always the handicap of freight to get over. Under the circumstances, Mr. Carpenter and his colleagues have decided that the proposal is not one which they can entertain. As to the Gaslight and Coke Company, Mr. D. Milne Watson, the General Manager, informs us that they have no definite offer of coal from Nova Scotia; but a letter has been received requesting an interview. The statements in the Daily Press therefore seem to be altogether premature.

Uniformity of Company Law.

The question of the attainment of uniformity of company law throughout the Empire, is one that has previously been referred to by Sir H. Llewellyn Smith when reporting to the President of the Board of Trade on matters relating to the Companies (Consolidation) Act of 1908; and he returns to the subject in the "Twenty-First General Annual Report on Companies" which the Board of Trade have just issued as a Blue-Book. It is remarked that considerable progress has been made in the direction of securing uniformity since the issue of the last report, when it was stated that in the Transvaal, Victoria, and British Columbia Acts had been passed following very closely the British Companies (Consolidation) Act of 1908. Subsequent to the date of the issue of that report, Ordinances on the same lines have been passed by the Legislatures in Barbados and Hongkong, and an Ordinance has been proclaimed in Swaziland. Bills have also been introduced in India, Nova Scotia, and Southern Nigeria. Then, again, at the Inter-State Conference held in Melbourne last January, a resolution was passed affirming the desirability of the company law of the different States being brought as nearly as possible in accord with that of England. From these particulars, it is clear that the claim is a just one that considerable progress has been made in the desired direction.

Registrations and Liquidations.

Glancing at the report dealing specifically with statistics for the year 1911 of matters within the Companies (Consolidation) Act of 1908, it is seen that the number of new companies registered in England and Wales during the twelve months was 5959. Deducting from these 2058 companies which went into liquidation (excluding three cases in which winding-up proceedings were stayed), and 2295 companies which were removed from the register on the ground that they were no longer carrying on business, the net increase of the year was 1606. The number of companies on the register in England and Wales on Dec. 31, 1911, excluding those which were in course of liquidation or removal from the register, was about 50,000. Among the companies licensed during the year by the Board of Trade to be registered with limited liability, but without the addition of the word "limited" to the name (as being associations formed not for the purposes of profit), are noticed the English Beet Sugar Pioneer Association and the Institute of Water Engineers. The power vested in the Board to appoint an auditor, if the appointment of auditors is not made at the annual general meeting of a company, was exercised in eleven cases. Leave to pay interest out of capital during construction was granted in four cases, including the Province of Buenos Ayres Water-Works Construction Syndicate, Limited. Proceedings to enforce returns to the Registrar of Joint-Stock Companies and to secure the filing of documents required by the Statute to

be filed for public information, were taken in twenty cases, and in all except one a fine was imposed. The total nominal capital of the companies registered in England and Wales last year was £150,621,767; the average amount of the nominal capital of each company registered being £25,276. Some of the names included in the list of companies dissolved or struck off the register during the year 1911 will be found on another page of this issue.

Association of Chambers of Commerce.

As was foreshadowed by the *agenda*, a large proportion of the discussion at last week's conference in Newcastle of the Association of Chambers of Commerce had to do with labour questions. Unlike delegates at the preceding Trade Union Congress, the Chambers of Commerce are desirous that measures should be taken by the Government to secure the right of employers to engage either union or non-union labour, and favour legislation prohibiting, under penalties, general lock-outs or strikes by employers or employees engaged in works of public service or utility without due notice and opportunity being given for a public inquiry and report by a Board of Investigation appointed by the parties to the dispute, with an independent Chairman. It is a meritorious desire which was voiced on the part of manufacturers and employers to get back to the old relations that prevailed between masters and workmen, and to encourage direct communication between employers and employees, and not allow men of extreme Socialist views to interfere. One speaker pointed out that the more militant leaders of the Labour Party had reserved to themselves the right to paralyze English trade, and maintained (with the evident cordial approval of his hearers) that when this warning had been given it was high time that the Government should receive a warning from the employers. A statement by Lord Joicey, that he was no believer in compulsory arbitration, was loudly applauded. He added that they could not compel a man to work against his wishes, and they could not compel an employer to carry on his works at a loss, unless the Government came to his assistance; but one thing they could do was to form public opinion. No great strike could take place for any length of time against public opinion. Lord Joicey did not express an opinion as to the efficacy of profit-sharing in allaying industrial unrest; but he seems to be in some doubt as to whether it can be applied in many industries without making the consumers pay more for their commodities. The Trade Disputes Act met with deserved condemnation, its repeal being demanded; and the formation of more voluntary Boards of Conciliation and Arbitration was urged—though the Lord Mayor of Sheffield rightly remarked that Boards of Conciliation would not be of much use unless their decisions were adhered to. A proposal in favour of the appointment of a Minister of Commerce did not meet with the approval of the majority of those present; but it was left to the Executive of the Association to urge on the attention of the Prime Minister such changes as they considered would add to the influence, efficiency, and usefulness of the Board of Trade.

The Law Relating to Trade Disputes.

While making reference to labour topics, it may be mentioned that copies have now been issued of a Bill presented by Lord Robert Cecil, which has for its object to amend the law relating to trade unions with respect to trade disputes, and to protect the provident funds of a trade union from civil liability in certain events. It is set forth in a memorandum that the measure is designed to restore the civil liability of trade unions in respect of tortious acts committed under their express sanction or recognition. But it is proposed to exempt from civil liability arising out of a trade dispute such part of the funds of a trade union as may be specifically allocated to provident purposes. To this end, the Bill empowers a registered trade union to set apart a provident fund, the accounts of, and dealings with, which will be kept distinct from those of the general or trade fund. For the absolute immunity from civil liability conceded by the Trade Disputes Act of 1906 to persons who induce others to break a contract of employment, there is substituted a limited immunity, which will take effect in only one case—that is, where the person who is induced to break his contract of employment was a free labourer whose contract was entered into for the purpose of assisting one of the parties to a trade dispute. This means, we presume, that when trade unionists are unwilling themselves to work—*i.e.*, when there is a "trade dispute"—they are still to be free to "induce" other persons who may have taken the vacant places to break their contract of employment. It must be added, however, that the Bill seeks to regulate "peaceful picketing" with respect to the numbers engaged and the place where it is to be performed. All pickets, too, are to wear a distinguishing badge.

PERSONAL.

Mr. Frank Day has been appointed as Chief of the Rental Department at the Old Kent Road station of the South Metropolitan Gas Company.

Mr. William Sharp Galloway, a member of the well-known Manchester engineering and boiler-making firm bearing his name, has been appointed a Director of the Stretford Gas Company, in succession to the late Sir Bosdin T. Leech.

At St. Michael's Church, Boldmere, near Birmingham, on the 7th inst., Mr. G. C. Pearson, Superintendent of the Coal-Test Plant of the Birmingham Gas Department, and Treasurer of the Midland Junior Gas Association, was married to Miss Irene Barber, eldest daughter of the late Mr. George Hampton Barber (who was Secretary of the Birmingham Gas Department), of Wylde Green. Among the gifts was one from Mr. Pearson's colleagues on the chemical staff of the Gas Department, which was presented to him at a gathering presided over by the Chief Chemist, Mr. E. W. Smith.

Last Thursday evening, Mr. J. Savage, J.P., was the recipient of a present in commemoration of his retirement from the Beckton Tar and Product Works. A purse of gold was subscribed by members of the Foremen's Association, of which Mr. Savage was the founder and Chairman; and it was handed to him by Mr. A. Burton, who remarked that Mr. Savage had been associated practically all his life with the many charitable organizations of East Ham, while at the works he was identified with every prominent movement. The subscribers to the gift all joined in wishing him many years of life in which to enjoy his well-earned retirement. Mr. Savage expressed his sincere thanks for the kindly sentiments which had been uttered, and for the notable display of good feeling towards him.

OBITUARY.

Mr. James Harding, who was known to many of our readers, as he had been a traveller for about fifteen years in the gas-stove industry, died on Monday last week, as the result of an attack of bronchitis, at the age of sixty-four. The funeral took place at Forest Hill Cemetery last Thursday.

The death is recorded at Ashton-under-Lyne of Mr. Richard Hooton, who was formerly Manager of the Ashton Gas Company, a position he relinquished about five years ago to go to Canada. Mr. Hooton, who was about 55 years of age, returned from Canada suffering from illness, from which he never rallied. Among the wreaths contributed for the funeral, which took place at Hurst Cemetery, was one sent by the Directors and staff of the Ashton Gas Company.

News has just reached England of the death, in his sixtieth year, of Mr. Frederick J. Mayer, the General Manager of the Didier-March Company, of New York. Deceased was born at Bremerhaven, and received his early education at the University of Stuttgart. He went to America in 1870, after the Franco-Prussian War, in which he saw active service. Being an engineer, he took an engagement with the Bartlett Hayward Company, of Baltimore, as draughtsman; and while with them as Chief Engineer he designed, erected, and operated many of the large gas plants constructed by the Company. In 1906, he severed his connection with them, and organized and founded the Didier-March Company—taking the position of "General Manager." Having made a life study of the carbonization of coal for metallurgical and domestic purposes, he must be credited with establishing in the United States some of the best foreign apparatus for the carbonization of coal by both the intermittent (Dessau) and continuous systems of vertical retorts for gas-works. He not only secured these rights for the United States, but he promoted the companies, erected the plants, and put them in successful operation. Mr. Mayer was the inventor of many improvements for the manufacture of illuminating gas, patents for which were secured in the United States, Germany, France, and England. Mr. Mayer was an ardent and tireless worker, well known in the United States and in other countries. He was a member of the American Gas Institute, the American Society of Mechanical Engineers, the Illuminating Engineering Society, the Chemists' Club, the American Peat Society, the German Club, and many other organizations. Deceased is survived by his widow.

Decisions by the Umpire under the National Insurance Act.—Among the recent decisions by the Umpire under the National Insurance Act are the following: Contributions are payable in respect of workmen employed as toolmakers, and engaged in making press tools, dies, &c., for use by meter makers and in the manufacture of lamps and gas and electric light fittings; but are not payable in respect of workmen engaged in turning and assembling the brass parts of domestic lamps, or in fixing, removing, or repairing the temporary gas-fittings attached to portable and removable market stalls.

ELECTRICITY SUPPLY MEMORANDA.

Holiday Amenities—Light on a Thread—Disregard—Mr. Harrison's Début—Things Left Unsaid on Cooker Reliability—An Electric "Gas-Ring" Wanted—An Electric Lighting Tale from Brighton—The Other Side.

HOLIDAYS are practically over; and the weather experiences have made many who sought change and rest glad to return to the daily or weekly round. The weather has been responsible for the necessity of occasional refuge in buffets and such-like places of public resort. It has been interesting to observe at the seaside town that invited us to sojourn in its enterprising area that the one or two places that served as shelters from the inclemency of the weather were fitted with both electric lamps and gas-burners maintained ready for use. At the hotel, however, whose terms secured patronage for the holiday, there were no gas-fittings for lighting. One evening a fuse went; and the sign displaying far and wide the name of the hotel suddenly discontinued its functions. The next day, an electrician by the aid of a mate sought to repair the mischief. But by dusk there were seven lamps on the sign that still refused to shed light, and thus the symmetry of some of the lettering was utterly spoilt. The time for dressing for dinner arrived. It was a darksome evening; and the miserable 32-candle power lamp in our bedroom refused to do its duty. The chambermaid's bell was busy; and it was found that the vigorous commands for her presence were due to the inability of the occupants of several rooms to obtain light. Inquiry in the regions below elicited the information that another fuse had gone, but that things would soon be righted. After a quarter of an hour's delay, during which many said unfriendly things of the inconstancy of the electric light, the lamps in the bedrooms again consented to perform their duty. But during dinner a little bang from outside was heard. Subsequent investigation showed that the outside electric sign was again extinct for the night. The hall porter sagely remarked that a mistake had been made in not having some gas-lights in the place. He had never, in the course of his experience, been in a "no-tel" before where the place was altogether devoid of the protection against disaster afforded by gas-burners.

The Islington failure on Monday night last week, when every single lighting point dependent upon the electrical current was deprived of it by a fusing and fire at the generating station, is commented on in our editorial columns, under the heading of "A Public Danger." The event brings to mind the strictures by the Governor of the Gaslight and Coke Company (Mr. Corbet Woodall), at a meeting of the proprietors early in 1910, upon the treatment that the question of street lighting received at the hands of municipal councillors having the control of electricity supply, as well as upon the brutal injustice to which the Company were subjected by a disclosure of their tenders to the municipal electric lighting department, and by the consequent undercutting. We remember that Islington has not been altogether free from indecorous incident in connection with the change-over from gas to electricity for street lighting, which change-over has not been to the advantage of the residents in point of economy and efficiency in comparison with the modern means of gas lighting. One fault at the electricity station, and the whole of the streets artificially illuminated by electricity were suddenly plunged into darkness. Traffic had to slow-up; and it was only by the exercise of the utmost vigilance of the police, assisted by an extra force, that order was maintained and accident prevented. Responsibility for the public safety sits lightly upon the shoulders of the municipal councillors; their greater concern is to give an advertisement for their electricity supply through the medium of street illumination. Those who depend upon electricity—especially public institutions and places of entertainment—also suffered heavy inconvenience; and danger menaced the people on all sides. "Light on a thread" is one graphic reference to the subject that appeared in the pages of a morning contemporary. These, however, are matters that are dealt with in the course of the article in earlier columns.

Three weeks have passed away since we replied to Mr. Alex. C. Cramb's effusion on the subject of church lighting at Croydon, and animadverted upon the figures that were published, with considerable gusto, by "Meteor" in the "Electrical Times." But there has not been any sign of the Britisher's love of fair play on the part of our contemporary by the publishing by it of the actual annual accounts as shown by the Gas Company's books, in contrast with the figures supplied to it by Mr. Cramb, nor have any of the other material points that we made in our two references to the subject been placed before the readers of our contemporary. Furthermore, Mr. Cramb has not accepted the challenge we made to him to place under a mutually conducted test some medium-sized inverted gas-burners (with mantles that have been running since March 2, and are still in use, and burners that have not been cleaned since the date named), and 50-candle power metallic filament lamps, to determine hours of service and illuminating power, using for each gas-burner 3½d. worth of gas, and for each metallic filament lamp 3½d. worth (1 unit) of electricity. The only conditions we imposed were that the results of the tests should be attested by the signature of Mr. Cramb, and that those results with his signature appended should be circulated through the "JOURNAL," and the electrical press, as well as broadcast in the borough of Croydon. What has made Mr. Cramb so shy of promptly accepting this challenge? He knows the address of the "JOURNAL."

Since our friend Mr. H. B. Renwick resigned the difficult position of the headship of the Electricity Publicity Committee, little has been heard of his successor (Mr. A. F. Harrison) in the public prints. But he has at length turned up, and has joined in the Harrogate cooking correspondence now running in the "Harrogate Times." We welcome him, and his contribution. He tells the readers of our contemporary, to show them what a reliable thing the electric-cooker is, that there was a restaurant electrically equipped at the Smoke Abatement Exhibition; and that 4000 meals were served there during the course of the exhibition. He does not say how many of these "meals" were simply afternoon teas. He also states that one of four restaurants at Shakespeare's England Exhibition at Earl's Court is electrically equipped; but he does not say why all four restaurants there were not electrically fitted up in view of the caterer's delight with electrical operation. Nor does he tell his readers that, notwithstanding the experience of Mr. Harrison, and the caterers at the Smoke Abatement Exhibition, the apparatus first installed at Earl's Court was not found suitable for restaurant purposes, and had to be replaced. He does, however, tell his readers that the same caterers have equipped the "Delico" restaurant in James Street with electrical cooking appliances, and that one or two trading establishments are similarly equipped. But what he does not make clear is that these various installations are all run by the experts of the London Home Delicacies Association, Limited, who, working in conjunction with the Marylebone Electricity Department, have specialized in this electrical cooking propaganda work. They even hold the contract for running the kitchen at Messrs. Debenham and Freebody's establishment; and Mr. Debenham is known as a prominent member of the Marylebone Borough Council!

Does it need (to use Mr. Harrison's words) "further comment to point the moral?" There is all the difference in the world between experts running electrical apparatus of this kind under the ægis of indulgent electrical experts and the same apparatus placed in the hands of the ordinary householder or the householder's servant. Mr. H. H. Holmes, the Sales Manager of the Marylebone Electricity Department confirmed this in recent discussions at the Institution of Electrical Engineers. He then declared that users of electrical cooking appliances should receive a visit from a competent inspector of such appliances at least once a week. He reiterated this in his paper at Harrogate before the Municipal Electrical Association. Mr. Holmes then stated that he believes in a weekly inspection by a competent person, and a visit once every six weeks for a few months by a lady demonstrator. If there is the absolute reliability that Mr. Harrison desires to impress, why these affectionate expert attentions? Then we have Mr. George Wilkinson, the Electrical Engineer of Harrogate, writing to the "Electrical Times" and advocating the issue of a specification for electric cooking apparatus. "At the present," he writes, "we have cooking and heating apparatus galore offered. Each is 'the best,' judged from the *ex parte* statements of the makers, and much money is likely to be wasted by purchasing apparatus on the chance of its being right, only to find afterwards that it is comparatively ill-fitted for the purposes intended." He also remarks: "The combustion of coal or gas furnishes an abundance of heat for cooking and heating purposes, whereas in the case of electricity a comparatively small number of thermal units are available. The assurance, however, of successful competition is largely in the fact that the energy in electrical form can be more intimately and directly applied for the purposes in view." We are not clear upon the point as to the "assurance;" but we corroborate Mr. Wilkinson in respect of the other points that are quoted. It will be obvious that Mr. Harrison, the Chairman of the Electricity Supply Committee, did not write such a long, interesting, and informative letter for the Harrogate residents as he might have done, on the subject of the reliability of electric cooking appliances.

Mr. B. Sankey, the Borough Electrical Engineer of Whitehaven, wants an electric "gas-ring"—that is to say, the equivalent of the gas-ring for use with electricity. A gas-ring is an inexpensive thing, and lasts a lifetime. What Mr. Sankey wants costs at present from £2 up to £3 3s.; and it has to be renewed rather more frequently than users would be inclined to regard as satisfactory. Such appliances as we know them also require a good deal of electrical energy and time to do the work that is done promptly and cheaply by the gas-ring. However, Mr. Sankey thinks he has a splendid opening for something of the kind if he can get an appliance cheap enough, as he has a very poor opinion of the local gas supply. The price of gas is said to be 3s. 8d.; and the gas is "of poor quality, and worse pressure." That is Mr. Sankey's statement; and the gas authorities of Whitehaven can settle the point with him, if they place any value upon the expression of his opinion, as published in the "Electrical Times" for August 29. Mr. Sankey wants a circular electric hot-plate, having two heats—say, 800 and 200 watts per hour; and the combination must be marketed at from 20s. to 30s. Fancy this price for a weakly pretender to equality with a robust gas-ring! The "Electrical Times" sits on the idea that a heater of the kind, with all its necessary electrical accessories, could be produced for such a price, unless there was an extensive demand (which is not anticipated) for an identical heater. The necessary attachments for its installation would work out to at least £1. In daily use, how long, with the usage meted out to the gas-ring, with heavily charged saucepans banged down on it, would such a device maintain that

primitive smoothness of surface that is essential to its good conduct? There is another point on which our contemporary does not agree with Mr. Sankey. The maximum 800-watt heat is not sufficient. To raise 4 pints of water from 60° to boiling-point with a 800-watt "Tricity" extension-plate takes 40 minutes! and this is too slow for the average householder. A 1000-watt plate would only shorten this time by seven or eight minutes. Mr. Sankey's desire is not within immediate realization.

The following is one side of a tale as told by the "Electrician" from details supplied by the Electrical Engineer of Brighton (Mr. John Christie); and it does not strike us as a good example of "the whole truth, and nothing but the truth:"

An enterprising firm in Brighton recently took over a drapery establishment as a going concern; and one of its legacies was the high pressure gas installation for the outside lighting. For the last few years the Gas Company have done their best with the job, and have installed various types of high-pressure gas-lighting appliances, the fittings being taken down every spring. Before the fittings were put up for the ensuing lighting season, Mr. Christie persuaded the proprietors to allow him to instal a couple of 500-candle power metal lamps. The Gas Company, immediately they saw these going in, fixed up one 500 and one 1000 reputed candle power high-pressure gas-lamps alongside. Opportunity was thus afforded of making a most interesting comparison. The high-pressure gas-lamps put up by the Company were of the latest single inverted-mantle type, and the 500-candle power metal lamps quite put the 500-candle power high-pressure gas jets [*sic*] into the shade. It also gave a better diffused and more brilliant light than the high-pressure mantle for which 1000-candle power is claimed. The consumption of these lamps was stated to be 8½ and 17 cubic feet per hour respectively; and this works out at the unheard of efficiency of 58-candle power per foot! [Our contemporary has surely been asleep.] As no more than 500-candle power is claimed for the metal lamps, and they practically equalled, if not swamped, the 1000-candle power gas-burner, the proprietors of the establishment naturally questioned the efficiencies claimed by the Gas Company. It is interesting to note that, including the maintenance charges for the ordinary lighting hours of a season from September to May, the metal lamp with energy at 3d. per unit works out at an estimated cost of £3 4s., as against £2 7s. and £4 for the 500-candle power and 1000-candle power gas schemes. The result of the experiment is that the Gas Company have been requested to remove the whole of their fittings; and this season the proprietors will have thirteen 500-candle power tungsten lamps fixed in their place. There is little doubt but that other and smaller users will follow the excellent example set by this firm.

This is the other, and the veracious, side of the tale: The high-pressure lamps first spoken of were of the 12-inch water-pressure type, and had been in use by the drapery firm alluded to [Messrs. Leeson and Vokins] for approximately four years from the date when the gentlemen named became the proprietors of the business of their predecessor, who had also had the lamps in use for nearly two years. It has been the practice during the whole of this time for the Gas Company to remove the lamps during the summer months when they were not required for lighting purposes, and to re-erect them early in September. This year it was pointed out to the proprietors that the lamps were, after nearly six years' use, showing signs of hard wear; and it was suggested that the Company should be allowed to erect the more modern and economic type of inverted high-pressure lamp. This proposal was, at first, not acceded to, on the ground that the light was too intense (single 1000 and 500 candle power Keith inverted high-pressure lamps are installed a short distance from the premises in question). The Gas Company next proposed that they should be allowed to instal two high-power *low*-pressure lamps on approval, and permission was given; the electricians having in the meantime erected two metal filament outside lamps. After the high-power *low*-pressure lamps had been erected, the Company were told by one of the proprietors that it was a pity they had ever passed over the inverted high-pressure lamp; and, on the Company replying that his partner had objected to this type of lamp as giving too intense a light, he accorded permission to erect two on trial—one of 500-candle power and one of 1000-candle power. These were duly erected alongside the two electric lamps, but to light totally dissimilar windows; those lighted by gas being dressed deep, with cloth goods of various shades, while both the windows electrically lighted were dressed right up to the glass with laces, cotton goods, &c. This was not a fair comparison. Regarding the costs quoted. The figures given for the gas-lamps include the supply of gas, cleaning, and maintenance throughout the lighting year; and to the sum has been added by the proprietors one-third of the cost of the lamps (they having insisted that the total capital cost should be charged in three years), whereas the cost of the electric lamps includes only current charges. It may be presumed that, as the metal filament lamps are invested by their friends with a nominal life of 1000 hours, the electricians have seen fit to avail themselves of the hypothetical life, seeing that no allowance for this item in costs has been made. Furthermore, no part of the capital cost has been charged to the electric lamps.

The real explanation, we may opine, is that the recent action of the Town Council in passing the recommendation of the Electricity Committee, that the charge for inside and outside lighting supplied to shops using a minimum of 15,000 units per annum should be 3d. per unit, is the real factor that decided the question, as the firm mentioned have other premises, and will now be enabled to avail themselves of the revised terms—thus effecting a saving of 1d. per unit on all inside lighting.

BRITISH COMMERCIAL GAS ASSOCIATION.

FURTHER particulars are to hand as to the business to be transacted at the forthcoming meeting of the British Commercial Gas Association at Manchester on the 8th and 9th prox. Beyond the particulars given in the "JOURNAL" for July 2 (p. 14), we now learn that there will be four papers in all read: (1) Mr. H. James Yates, on "The Aims and Claims of the B.C.G.A."; (2) Mr. George Clarry, of Cardiff, on "The Importance of Showrooms in the Development of Gas Supply"; (3) Mr. J. Ferguson Bell, of Derby, on "The Development of Coke Sales; (4) Mr. H. H. Creasy, of the Gaslight and Coke Company, on "A Campaign Amongst the Doctors."

Last Thursday there was a meeting, at the offices in Victoria Street, of the General Committee of the Association, at which a report of the Executive Committee was considered.

In the course of this report, the Executive Committee state that the work of approaching non-subscribers on the question of joining the Association has been and is being carried on by many members; and the following undertakings have been added to the list of subscribers since the last meeting of the General Committee: Barnstaple, Brecon, Colchester, Earls Colne, Gloucester, Guildford, Kingston-on-Thames, Leyland, Penzance, Preston, Redcar, Rhymney and Aber Valleys, Salisbury, and Southport. The list of non-subscribing undertakings is nevertheless a very lengthy one; and members are asked to take every possible opportunity of bringing persuasion to bear upon those connected with such undertakings. It is hoped the forthcoming conference will prove of great service in demonstrating the value of the Association's work. Representatives of all undertakings of a hundred millions output and upwards will be invited, and members can do useful work in endeavouring to secure the attendance of those who have influence with the non-subscribers.

Additions to the list of the associate members bring the total number up to 82. Members are asked to bear in mind that they can render useful assistance to the Association by securing the addition to the roll of associate members of the names of all officers on their staff who are connected with the selling side of the business—interpreting that word in its broadest sense, as including all who are brought into relationship with the public. Some further international members have also been enrolled.

Though, for financial reasons, and because the holiday season is the least fruitful time for publicity work, only a very limited amount of advertising was done during the past three months, the number of inquiries received has been well maintained—showing that the interest created by the Association's advertisements is of a permanent character. The inquiries (which total to date 2959) have been dealt with, and afterwards forwarded to 148 subscribers and 376 non-subscribers. Newspaper correspondence in defence of the interests of the gas industry has been conducted in several places. The "Bulletins," judging by the expressions of appreciation received, are fulfilling a useful purpose.

The publicity literature available (which has met with very general approval) is always growing; and orders for some 570,000 booklets, leaflets, &c., have been received.

The compilation of a pamphlet for the use of teachers, giving material for "Lessons on the History and Uses of Gas," is in hand. Assistance, by way of advice, the supply of special literature, the drafting of advertisements, &c., has been given to a considerable number of undertakings,

As a result of the ballot for the election of a Vice-President to take the place of Mr. Corbet Woodall on the General Committee, Mr. Hanbury Thomas, of Sheffield, has been elected.

Arrangements for the first annual general meeting and conference in Manchester [some particulars of which were given in the "JOURNAL" for July 2, p. 14], are in a forward state.

We have received from Mr. W. M. Mason, the Secretary of the Association, a copy of the first edition of the "Blue Book" of gas advertisement line blocks. This has been prepared with the same object as the Association's "Red Book" of half-tone illustrations, which was noticed in the "JOURNAL" for July 30 (p. 321), and contains pictures eminently suitable to appear in newspapers, magazines, bazaar, concert, or other programmes, and for general periodicals. The book is, of course, for the use only of subscribers, who can obtain from the Association, on very favourable terms, stereos of any of the illustrations shown. Mr. Mason also forwards a packet of attractive post-cards emphasizing the advantages of gas.

Disappearance of Higher-Boiling Phenols in Creosoted Wood.—Mr. S. Cabot, writing in the "Journal of Industrial and Engineering Chemistry," says the higher-boiling coal-tar phenols on prolonged exposure to air become converted into tarry substances insoluble in benzene, but soluble in acetone. A portion of this tarry matter is insoluble in 10 per cent. sodium hydroxide solution, but soluble as an alkali salt in water; a portion forms a salt with alkali that undergoes hydrolysis on solution; and a third portion has a very slight affinity for alkali. The higher-boiling phenols remain in creosoted wood as complex oxidation products.

GAS EXHIBITS AT OLYMPIA.

To the many and varied displays of which Olympia had previously been the home there has now to be added the first exhibition of Oil Engineering, held during the past ten days in conjunction with the Hardware, Ironmongery, and Domestic Appliances Exhibition. All the exhibits were well arranged, and there was plenty of space to admit of easy inspection of everything that was on view. Perhaps, however, in the case of future similar combined exhibitions it may be found practicable to have but one "Official Catalogue." On this occasion there were two, both published at the same price; but whereas one of them apparently contained a full list of the firms exhibiting, the other referred only to the oil section. The general visitor who, not noticing that there were two, by chance got hold of the complete list, must have gone away oblivious of his good fortune; but the writer, less lucky, was surprised to discover on commencing a tour that the "Official Catalogue" he had happened to purchase did not by any means furnish an account of all to be seen. Of course, investigation and explanation followed, and the simple remedy was taken. Quite possibly it was thought that those concerned with a business of such great present (and still greater future) importance as the oil industry would not care to be burdened with particulars of things like vacuum cleaners—though the reverse was evidently not believed to hold good.

As to the stands themselves, there was quite a big display of acetylene apparatus, for lighting and other purposes; and several air-gas systems were represented. Of oil-engines, too, there were a number. In the way of exhibits in which "JOURNAL" readers are more particularly interested, in the heating division there was the Hammond "Record" water-heater and the "Reznor" portable gas heating-stove. The latter was on the stand of Messrs. Butler Bros., of Oxford (who also showed the "Strand" mantle). It is a reflector stove, with a luminous burner; the idea being to throw the heat down to the floor.

In the lighting department, Messrs. J. Marse and Co., of Ludgate Circus, exhibited a full range of their "Visso-Marse" burners —the smallest giving a light of 14 candles (with a consumption of ½ cubic foot of gas per hour). The principle by which the excellent results of the firm's well-known upright burner are obtained has now been adapted to the inverted style, under the name of the "Orel" burner, which is made in two sizes. The bijou consumes about 1¼ cubic feet of gas per hour, and the larger size 2½ feet. The fact that the particular type of mantles supplied by Messrs. Marse and Co. always remain flexible is pointed to as an advantage in cases where vibration exists.

The only other display which calls for notice here—and really an excellent one, too—is that of Holophane, Limited, of Cartaret Street, S.W., whose specialities are widely adopted in connection with both gas and electric lighting systems. There are diffusing globes of various shapes for gas-burners, designed in some cases so as to throw a strong light downward, and in others to give a high illuminating effect in all directions below the horizontal. There are also a variety of reflectors to meet different requirements. Globes and reflectors are, in fact, to be had suitable for any kind of light in every position. A number of new patterns are just being placed on the market. These at present are under test, and their exact efficiency has not been defined. It is known, however, that they give excellent results. Arrangements were made to show some of the reflectors in use, so that visitors could have unquestionable proof of the improved light obtainable by their use. The whiteness of the light, too, is particularly noticeable, and it is easy to believe that the most sensitive of colours can be perfectly matched by it. With the present "Extensive" reflector for inverted burners (for sideway illumination), "Intensive" (for general illumination), and "Focussing" (for concentrated illumination), the Company claim that it is possible to double the illumination without any greater consumption of gas. In addition to the concentrated illumination, the reflectors, of course, allow sufficient light to pass through to illuminate the upper part of the room. Metal collars are provided to do away with risk of breakage; and the use of a half-obscured inner bulb chimney is recommended to shut off the incandescent mantle from view. The reflectors do not require to be taken down for cleaning, but simply need brushing over; and dust has no effect on their concentrating power. Both globes and reflectors have an exceedingly attractive appearance in use, apart from the increased illuminating effect which they give.

Wales and Monmouthshire District Institution.—The meeting of the Wales and Monmouthshire District Institution of Gas Engineers and Managers will be held in the Gas Offices, Bute Terrace, Cardiff, on Wednesday of next week, when the retiring President (Mr. E. H. Swain, of Pontypridd) will introduce the President-elect (Mr. T. E. Franklin, of Barry). The technical business will include the discussion of the paper on "Gas Testing for Small Works," which was presented by Mr. Evan Rees, of Blaina, at the last meeting, and reproduced in the "JOURNAL" for May 14 last, p. 445; and a paper on "Repairs to a Leaky Gasholder Tank," by the Hon. Secretary (Mr. Octavius Thomas, of Pentre). After the meeting, the members will be the guests of the Chairman and Directors of the Cardiff Gaslight Company at luncheon; and the afternoon will be devoted to inspecting the Grangetown Gas-Works, under the guidance of Mr. H. D. Madden, the Engineer.

STATISTICS OF DUTCH GAS-WORKS.*

THE latest issue of the statistics of the working results of gas-works in Holland, referring to the year 1910, follows the lines of previous volumes, and, like that for 1909, has been prepared by Heer P. Bolsius, the Manager of the Bois-le-Duc Gas-Works, Heer M. van der Horst, of the Amsterdam Gas-Works, and Heer G. A. Brender à Brandis, of The Hague Gas-Works. [See the "JOURNAL," Vol. CXV., p. 796.]

The statistics in the present issue relate to 141 gas undertakings, compared with 138 for the previous year. The undertakings which have not supplied information for the statistics are all of minor importance, and the compilation may be regarded as substantially complete, in respect of the municipal gas undertakings in Holland, and fairly complete also in regard to those in private hands. According to an article by Heer N. W. van Doesburgh, the Manager of the Corporation Gas and Electricity Works at Leyden, in the current number of "Het Gas," there are 186 gas undertakings in Holland, of which 136 belong to municipalities, and 50 to private companies or individuals. Of the municipal gas undertakings, however, only 121 are coal-gas works, two are oil-gas, and one (Brummen) uncarburetted water gas. The remaining twelve are acetylene and air-gas works. Of the 121 coal-gas works, the statistics for 1910 deal with 116. The 50 gas undertakings in private hands comprise 40 coal-gas works, two oil-gas works, and eight air-gas and acetylene works. Of the 40 privately-owned coal-gas works, the statistics include particulars as to 25.

The districts supplied by the whole of the gas undertakings comprise 60 per cent. of the total population of Holland. The districts of the 116 corporation gas undertakings included in the statistics alone comprise 53 per cent. of the population of the country. The total production of gas by these undertakings in the year 1910 was 13,817,877,000 cubic feet, which is an increase of 4·88 per cent. on the production for 1909. Water gas is made by 17 municipal undertakings; and the ratio of coal gas to water gas (carburetted or uncarburetted) for all the works is 81·2 : 18·8. Of the total output from corporation works, 64·5 per cent. is supplied through ordinary meters, 24·4 per cent. through prepayment meters, 6·3 per cent. is used for public lighting, and 4·8 per cent. represents works' consumption, unaccounted-for gas, &c. Apart from public lighting, there has been an average increase of 4·75 per cent. in the quantity of gas sold over that sold in 1909. The number of ordinary gas-meters on Dec. 31, 1910, was 274,552, and of prepayment meters 214,946. The ordinary meters had increased in number in the twelve months by 4·9 per cent., and the consumption of gas through them by 2·4 per cent.; while the prepayment meters had increased by 10·2 per cent., and the consumption of gas through them by 11·4 per cent. The consumption of gas for public lighting increased by 4·5 per cent. during the year.

The raw materials used in gas making by the 116 corporation gas-works in 1910 were as follows: German gas coal, 731,000 tons; English gas coal, 325,185 tons; cannel, 426 tons; rosin, 2·6 tons; gas oil (from Java, Borneo, Roumania, Galicia, and America), 20,610 tons; petroleum spirit, 1881 tons; benzol and zylol, 86 tons. The make of gas per ton of coal averaged 10,621 cubic feet. The consumption of coke as fuel for heating the retort-settings averaged 17·93 per cent. by weight of the coal carbonized. The liquor is worked up to sulphate by 37 undertakings; and the average yield of sulphate is 18·3 lbs. per ton of coal carbonized. The tar produced in carburetted water-gas plant averaged 20·8 per cent. by weight of the oil used, and the oil-gas tar, produced in Rincker-Wolter plant, averaged 8·3 per cent. of the oil used in that plant. During the last five years there has been a gradual decrease in the average consumption of gas per ordinary meter, and an increase in the average consumption per prepayment meter. There has been a very slight increase in the number and aggregate horse-power of gas-engines in use throughout the country.

It may be noted as of interest that Amsterdam, with 573,131 inhabitants, had, in 1910, a far larger output of gas than any other Dutch city—viz., 3,240,845,896 cubic feet; while The Hague, with a population of 280,504, had an output of 1,764,953,929 cubic feet. Rotterdam, with a population of 426,888, had the relatively low output of 1,721,507,368 cubic feet. In Amsterdam, the whole of the coal gas was made in horizontal retorts; but in The Hague, and in Rotterdam, there was a proportion of inclined retorts, and at Rotterdam one setting of large carbonizing chambers. Apparently no vertical retorts were in use in Dutch gas-works in 1910; but we believe some installations of them have come into use since that year.

The present volume of statistics, like its predecessors, should form a very valuable work of reference for all interested in figures relating to gas supply; and the Dutch Association of Gas Engineers (under whose auspices it is prepared) and the compilers deserve the thanks of their *confrères* for the expense and labour involved in its preparation.

* "Statistiek Overzicht der Bedrijfsresultaten van de Gemeentegasfabrieken en eenige particuliere Gasfabrieken in Nederland, in 1910." Bewerkt door P. Bolsius, 's-Hertogenbosch, M. van der Horst, W.I., Amsterdam, en G. A. Brender à Brandis, T., 's-Gravenhage. Vertrouwelijke Mededeeling. C. N. Teulings, 's Hertogenbosch; 1912.

PRESENTATION TO MR. WASTELL.

THE esteem in which Mr. Wilfrid Wastell (who was recently appointed Secretary of the South Suburban Gas Company) is held by his late colleagues in Birmingham was strongly evidenced by the large and very enthusiastic gathering of the staff of the Corporation Gas Department which met on Tuesday last, at the Midland Hotel in the city, to wish him an affectionate "Good-bye," and to present to him a tangible expression of their goodwill. Mr. R. S. Hilton, the Secretary and Manager of the department, presided. The presentation took the form of a solid silver tea and coffee service, a handsome writing table, and an album containing the signatures of 240 subscribers.

In asking Mr. Wastell's acceptance of these gifts, Mr. Hilton said that all connected with the department rejoiced at the appointment he had secured; but it was with very deep regret that they had to say "Good-bye." He paid a tribute to the services Mr. Wastell had rendered to the city and to the Gas Department, and expressed the hope that his devotion to duty would act as a stimulus to the younger members of the staff. All who had come in contact with Mr. Wastell had been struck by the quiet thoroughness and ordered method with which he had carried out his duties, and had found him absolutely straight in every sense of the word. They congratulated the South Suburban Gas Company on obtaining his services, and accounted it no small matter for pride that Birmingham had been asked to supply a Secretary to one of the leading Gas Companies in London. His removal would be a great loss to the Birmingham Gas Department.

Speeches in praise of Mr. Wastell's sterling character and ability were also made by Mr. W. H. Powell (Cashier), Mr. A. W. Tooby (Office Superintendent), Mr. S. R. Barrett (Gas-Fittings Superintendent), Mr. Enoch Evans (a superannuated member of the staff, and one who was at one time intimately associated with Mr. Wastell), Mr. John Foster (Engineer at the Windsor Street works), and Mr. T. S. P. Higgs and Mr. A. W. Smith (members of the staff). The enthusiastic unanimity with which all the commendatory remarks were applauded by the staff was sufficient evidence of their sincerity.

Mr. Wastell's reply was eloquently brief, and expressive of his deep appreciation of his colleagues' remarks. It may be mentioned that Mr. Wastell was accompanied by his wife, who was given a warm welcome by the staff.

During the evening an enjoyable musical programme was contributed to by several members of the Gas Department.

MODERN RETORT-SETTINGS.*

THIS work is an up-to-date account of retort-settings as now used in modern gas-works; and it is not difficult to see that the author writes of a subject in which he is both interested and experienced. Alterations in the construction of retort-settings have been very necessary of recent years, owing to the increased heats worked. As a result, it has become essential to use a great deal of care in building the settings and in protecting the retorts. With regenerative settings it is so easy to obtain excessive heat in the combustion chamber, that it is imperative to thoroughly protect the retorts in this part of the setting. The author's views on construction are distinctly sound; and those readers who have not had much experience in this branch of gas-works engineering will gain much information from a perusal of the book.

The volume contains 202 pages, and is divided into fourteen chapters and an appendix. Eight of the chapters deal with the constructional side of the subject; the remaining six treating of the working of the settings, and with the theory of combustion as applied to the heating of retorts. The details of construction are well illustrated, and many useful hints are given.

It must, however, be stated that the work is to some considerable extent an enlarged and revised edition of G. P. Lewis's book on the same subject. At least six of the chapters are almost identical, while many long extracts from the same volume are contained in the other chapters without reference of any sort, except in the preface, where it is stated that "the author wishes to express his indebtedness to the little book by G. P. Lewis (now out of print) for some of the information contained herein." As a matter of fact, by far the larger portion of Lewis's book—which in point of size is about half that of the work under review—is reproduced in the latter; so that the brief reference in the preface gives a wrong idea of the extent to which the author is indebted to the work by G. P. Lewis. Practically speaking, the whole subject from a theoretical and chemical standpoint is abstracted from the earlier publication, while the part dealing with constuctional matter and with the practical working of regenerative settings is original. As a case in point, of the nineteen tables included, twelve are copied from Lewis.

To deal briefly with the contents: Chapter I. treats of the distinction between direct and gaseous firing; while in the second chapter we have "The Theory of Combustion—Effect of Steam Supply." Next comes "Foundations—Cellars or Subways;" and "Stage Floors" in rather a short chapter, followed by details as to the "Chimney and Retort Bench." These two late chapters, so far as they go, are quite good. The subject might, however, have been somewhat extended with advantage. Chapter V. gives some particulars as to direct-fired settings—a matter of limited interest nowadays, though it must be said that the author is to some extent correct in stating that "it is the custom of many engineers to recommend regenerators, even for the smallest works. This is a mistake. In a small works, with little storage capacity, it is often necessary to light-up a bed and get it to work in a few hours. Direct-fired beds will meet this sudden demand much better than regenerators. If the latter are used for emergency purposes, they must be kept constantly under slow fire; and in this way they often consume more fuel than they save when in action. Moreover, if the regenerator is to be more economical than the direct-fired setting, when in ordinary use, it must receive more skilled attention than is usually to be found on very small works."

There is here the subject for a very good paper by an engineer experienced in the fitting-up and working of small gas-works. The writer would, however, express the opinion that the engineer who recommends regenerative settings for small gas-works should go further, and see that the man in charge receives some special training before taking them under his care. As regards the other point, regenerative furnaces might well be fitted to the settings required summer and winter, and direct-fired furnaces to those required in the latter months only.

Next follows Chapter VI., on the "Producer and Setting for Generator and Regenerator Installations." This is a long chapter—nearly as long as the five preceding ones combined. It would have been better to have divided this subject into two chapters. The author deals adequately with the producer and the various details involved in its construction, due regard being paid to provision against excessive wear and tear. The author is of opinion that the cross walls in a setting should not be built up to the arch, for fear of the arch dropping and putting a great deal of weight on the top retorts. Those engineers who are using heavy charges, particularly in the case of "filled" retorts, will hardly endorse this opinion, as the discharging of a very heavy charge exerts a great pressure on the crown of the retort, and unless it is well supported from the arch by means of the cross walls, large pieces of the crown are likely to be pushed upwards. The writer has seen all the top retorts in a bench not so constructed placed *hors de combat* by this means. In this case, pieces 2 and 3 feet long were forced several inches upwards.

A notable omission is any reference to settings of ten retorts. Considering that this type of setting is very extensively used throughout the country, and especially in London, where at least 90 per cent. of the settings are of this type, it is to be regretted that no mention is made of a setting which has so many advantageous features.

Advice as to the design of the combustion chamber is quite a feature of the book. A fair amount of space is devoted to the details of inclined retort settings; and it is noteworthy that the author, though experienced in their working, is by no means in favour of their use, as compared with horizontals.

A large number of different types of regenerators are illustrated in Chapter VII., and general considerations in the choice of design and in the details of construction are well expressed. The question of bracing the regenerator is, however, omitted, which is a pity, as it is imperative this should be adequately done.

The next chapter, on Retorts and Bricks, includes the report of the Refractory Materials Committee. "Retort Bench Ironwork" is fairly well done, but might with advantage have been considerably enlarged. A few details of hydraulic mains and tar-towers are given, but not nearly enough as are warranted by the importance of the subject. Only isolated examples come in for any attention.

The Working of Regenerator Settings (Chapter X.) contains a good deal of useful information, and is likely to be of service to those who have not had much practical experience. A good description is given of the different systems of vertical retorts, of which the more recent examples—viz., Dempster's and Wilson's Glasgow verticals, are accorded some attention. Herring's Edinburgh system is also not overlooked.

The three last chapters, on the analysis of producer and waste gases, pyrometer tests, and the distribution of heat in producer and settings, bring to a conclusion a book for which there is likely to be a fair demand. It deals with a subject which is alive with interest to a large section of workers in the gas industry; and in the contents will be found much that merits careful study alike on the part of students and practical men.

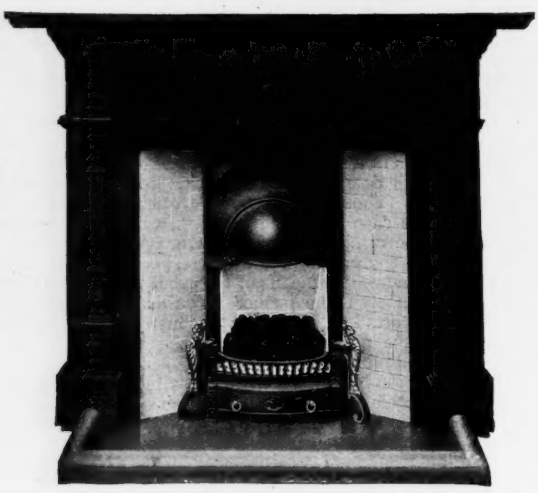
* "Modern Retort Settings: Their Construction and Working." By T. Brooke. London: John Allan and Co., 1912. Price 7s. 6d. net.

The High-Pressure Lighting for the Leeds Markets.—With reference to the paragraph on this subject which appeared in the "JOURNAL" last week, we learn that the lamps to be used are manufactured by the James Keith and Blackman Company.

Eastern Counties Gas Managers' Association.—As already briefly announced in the "JOURNAL," the next meeting of this Association will be held at Ely on the 27th inst. We learn from the programme issued by the Hon. Secretary and Treasurer (Mr. Joseph Davis, of Gravesend) that two new members will be proposed for election, and that the technical business will consist of the address of the President (Mr. T. A. Guyatt, of Ely) and a paper by Mr. A. E. Broadberry, of Tottenham, on "Cyanide Recovery Plant." In the evening, the members and friends will dine together at the Bell Hotel, in the Chequers Hall of which the business of the meeting will be transacted.

GAS-FIRE AND COAL-FIRE GRATES.

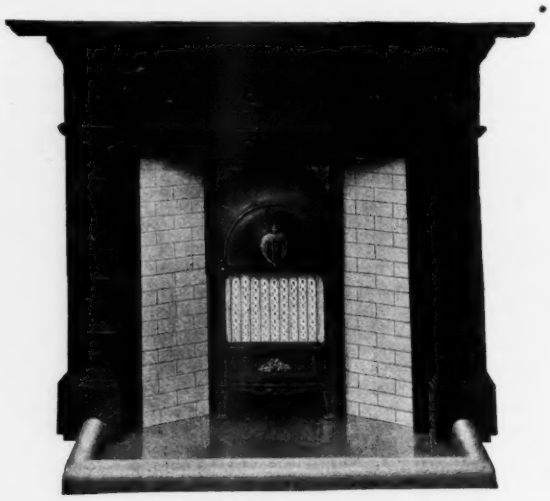
In two articles in the "Journal" for Sept. 3, reference was made to the anomalous condition of things that exists at the present day through architects and builders constructing houses with the coal-fire grate in every room, while the probability is that the first incoming tenants will require to use gas-fires in the rooms that are intermittently occupied, and perhaps in some cases in those that are permanently occupied. This at once raises the question, Why not place the gas-fire grate in such rooms at the outset, instead of following the wasteful course of putting in a coal-fire grate, and then either dragging it out for the proper accommodation of the gas-fire, or spoil the symmetry and general appearance of the room by setting the gas-fire in front of the coal grate? The fire-place is generally the central feature of a room; it is the part of the room round which the occupants naturally gather in wintry weather; and therefore it should be made as sightly as possible. There is no occasion now for architects and builders to force this incongruity upon tenants; for the gas-fire grate is (as was shown in the articles already referred to) at command the same as the coal-fire grate.



"D.S.O." Interior, fitted with St. Nicholas Fire.

It is due to Messrs. R. & A. Main to say that prior to these articles appearing in the "Journal," they had been working in the same direction, and had in fact gone a step farther. In a catalogue issued by them last February, the firm recognize that for some time to come both coal-fires and gas-fires will have their adherents, and that this is an excellent reason why the actual heating appliances should be so constructed as to be adaptable either for one or other fuel, and that without trouble or expense—a point bearing upon this argument being, of course, the somewhat frequent change in house tenancy in some of the constituent parts of our social system. However, as the result of the careful standardization of the most modern patterns of gas-fires and interiors, Messrs. Main have put on the market a complete series of combination gas-fire and coal-fire grate interiors—the gas and coal fire portions being absolutely integral and interchangeable parts of the composite whole. There is always the difficulty that a landlord cannot possibly know whether his future tenants will prefer coal or gas in their rooms; and the only way to ensure that all tastes are catered for is to use a coal grate specially adapted to a modern gas-fire, with the view to this being ultimately fixed. The "D.S.O." interior grate has been designed to fulfil this idea. In all respects, it is an up-to-date coal grate, but it is so designed that the St. Nicholas gas-fire or the "D.S.O." adaptable gas-fire forms an integral part of it at will, without any alteration of fitting in any respect whatever. This, too, is an important feature, that the gas-fires are not specialized to the "D.S.O." interior, but the "D.S.O." interior is specialized to the gas-fires. Hence the latter may be, and are, used with success in conjunction with any interior; but in conjunction with the "D.S.O." interior, they form a complete and harmonious whole.

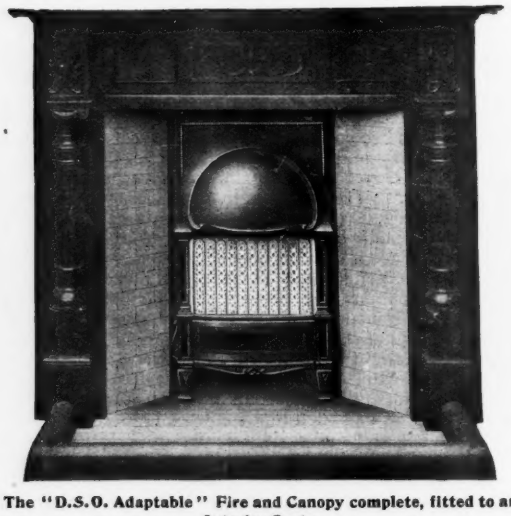
The firm also, when first introducing these grates, pointed out to architects that it is impossible for them to predict the desires of the future occupants of houses as to the form of heating fuel which they will choose to employ, and to compel what looks like a makeshift—irrespective of any intrinsic merit of design or efficiency in the gas-fire itself—by placing a gas-fire before a coal grate, is rather an arbitrary proceeding. Therefore, the value to the architect, as well as to the tenant, of the adoption of a heating arrangement that is convertible at will from coal to gas and from gas to coal by simply placing the gas-fire in position in the special coal-fire grate as an integral part of it, or by removing it, has distinct and far-reaching advantages. The coal-grate can be supplied in any form—with front bar, low fire, fall bar, or barless; so that suitability of grate for the reception of the gas-fire does



D.S.O. Interior, fitted with "Adaptable" Gas Fire.

not mean the restriction of the grate to any single design, though in any one of the constructions the form is very simple. One difference from the conventional style of coal grate is the fixed canopy, which in appearance is an improvement on the standard type of adjustable one. The fires are supplied in any finish—black, armour bright, or porcelain enamel. The last-named is surely a novelty in the finish of a coal-grate interior.

Speaking of architects and gas-fires, Mr. A. P. Main is of opinion that the former might give the tenants of houses material increase of heat from gas-fires by providing a vertical column or pilaster on the walls of the rooms—say, 9 in. by 2 in.—for the conveyance of the products of combustion. The column, in his opinion, would not look unsightly—in fact, it could be made to break the stiffness of the straight-walls. If, however, this was objected to, a similar column could readily be sunk into the wall, practically forming part of it. The idea, of course, is that a good proportion of the waste heat contained in the products of combustion would be usefully utilized in heating the air of the room at all levels, by the surface of the column itself becoming heated, and in turn transferring that heat to the air.



The "D.S.O. Adaptable" Fire and Canopy complete, fitted to an Interior Grate.

Gas Power in Textile Mills.—At the Congress of the Textile Institute held at Hawick last week, a series of papers on "Mill Driving" were read. They were intended to form a general introduction to the detailed treatment which the subject is to receive from a Special Committee which has been appointed to investigate and report on the best methods of driving machinery in textile factories. The advantages of gas power were set forth by Mr. T. Roland Wollaston, of Manchester, who gave figures of gas power performances. He dealt in detail with the criticisms generally advanced in opposition to the installation of gas-engines in textile mills. The maintenance charges upon a well-managed gas plant, he said, were considerably lower than those on the equivalent steam plant. Gas might be taken practically any distance to its work without measurable loss; it could be applied to dry, heat, or boil with far greater ease and facility of control than was possible with steam. Another advantage peculiar to gas power alone was the recovery of valuable bye-products, sulphate of ammonia and tar.

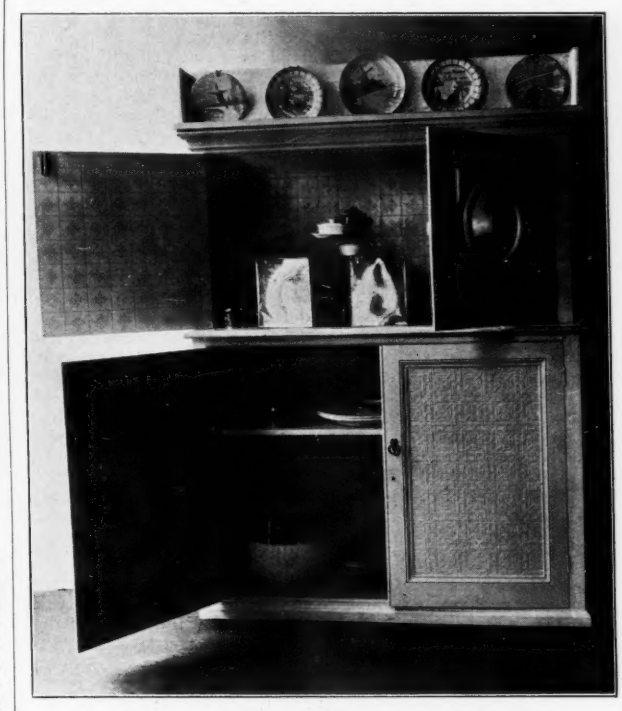
A PRAISEWORTHY CAMPAIGN.

The Part Played by Gas.

Reference was made in our pages some weeks ago to the fact that the Society of Medical Officers of Health had arranged, at their headquarters, No. 1, Upper Montague Street, Russell Square, an exhibition of very special interest to the members—it being rightly felt that the Society is one that should be foremost in any social movement. It is in connection with the efforts being made to combat that terrible national scourge, tuberculosis; and the intention is for it to remain open for at any rate a year. Thus there will be ample opportunity for inspection by those who are —we will not say interested, for the matter is one that should interest everybody—professionally concerned with the exhibits, which include all manner of things for employment in dealing with the dread disease. Enormously important as it is, however, the "curative" aspect of the exhibition, from a strictly medical point of view, hardly comes within the scope of the present article, which, from the circumstances of the case, must be devoted more to the "preventive" side of the question. Before proceeding, it may be pointed out that the exhibition is primarily intended for the convenience of medical officers of health and tuberculosis officers; but admission will be given to general practitioners, to members of the public health service, sanatorium benefit committees, insurance committees, sanitary committees, health visitors, and private patients, on presentation of visiting card. Nurses in uniform will also be admitted on application. Already there has been a large attendance; the visitors' book including the names of doctors from all over this country and many places abroad.

The Gas Exhibit.

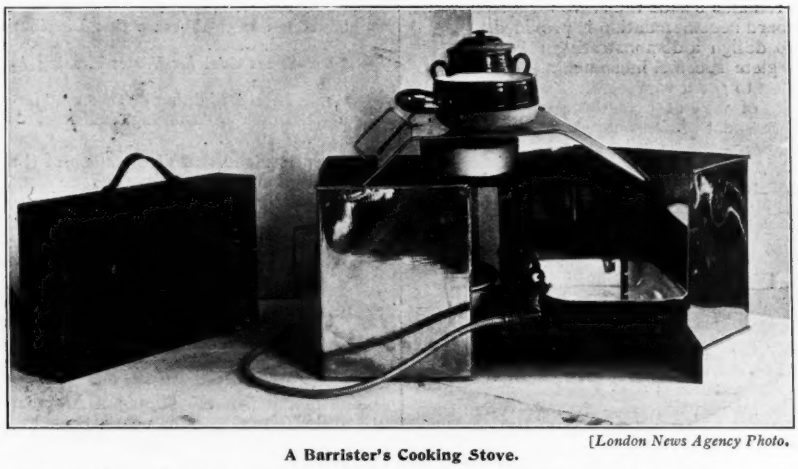
Medical officers of health have, it will be recalled, already shown their approval of gas as a lighting medium, by installing it, in place of electricity, in the building where their Society is accustomed to meet; and now opportunity has arrived of demonstrating, on a large scale, what can be accomplished by the same all-useful commodity in the direction of cooking and heating. In this branch it was, of course, not sought to gather together a competitive display of gas apparatus, and the exhibit was placed in the hands of one firm who could supply patterns of all the appliances required. Messrs. John Wright and Co., the firm with whom the arrangement was come to, have accordingly installed everything that is needed for a complete institution kitchen, suitable for sanatoria purposes—based on the cooking arrangements recently supplied by them to a Coventry institution. In addition to cookers of different sizes, there is a large and serviceable "King Alfred" bake-plate, and a "Vega" vegetable and pudding steamer, provided with automatic water-supply cistern. In institutions of the character of those in mind, a plentiful supply of hot water is of no less importance than are satisfactory cooking arrangements; and in this connection Messrs. Wright and Co. make a good display. There are specimens of the "Sun" automatic hot-water circulating apparatus, where the storage tank and boiler are in one; the "Calefactor," intended for use in cases where the installing of the "Sun" might not be so convenient as



[*London News Agency Photo.*

Kitchen Range Substitute—Exhibited by the Society of Medical Officers of Health.

that of a circulating apparatus with a separate storage tank; and the "Hotwell" gas-heated automatic low-pressure boiler, specially suitable for dispensaries, &c. These are all connected up. There are also a "Garajo" gas-heated boiler system for supplying hot-water pipes or radiators, and a large boiling-pan. Apart from the kitchen fittings, but invaluable for the sick room, the up-to-date gas-fire is represented by the firm's "Stadium" pattern,



[*London News Agency Photo.*

A Barrister's Cooking Stove.

This cooking stove, which is now being exhibited and demonstrated with by the Society of Medical Officers of Health, is the "last word" in hygienic cooking appliances. It will cook a dinner for six people, has three ovens of varying temperatures, a device for warming plates, and only a small gas-burner, the flame coming in contact with asbestos. It can be taken to pieces, cleaned, and packed into the bag (also seen in the picture). It is the invention of a barrister.

fitted with duplex burner, which can be cleaned without disconnecting the fire. No fear is felt that this fire will fail to satisfy the doctors that no fumes come out into the room. In fact, it may be taken that everything in the exhibition is approved by members of the Society. Then the "St. Andrew" radiator is shown in different forms. There is one fitted with wheels, so that it can be moved about from place to place as desired, and another has a live steam rail for towel drying—a device which is much favoured by nurses. Of course, the radiators can be provided with a flue, when this is desired. For their own use, in the large meeting-room, it may be mentioned, the Society have one of the same firm's handsome "Kenilworth" dog-grate fires.

There is to be seen in action at the back of the premises a Webb patent sewer ventilating lamp, which permits the closing of all surface manhole grids, and is designed to ensure perfect ventilation. The Zurich system of dust and refuse collecting is designed to enable rubbish to be taken from premises and discharged without any chance of scattering. It is creating much interest, and gives one the impression that this country has still a lot to learn in the way of preventing the exercise of the dustman's calling from being a possible means of spreading disease. There is a goodly list of countries in which the Zurich refuse collecting system is adopted; but the name of England is not included.

Cookery in Health and Disease.

The preceding paragraph has reference particularly to the "preventive" side of the subject; and this aspect may now be pursued a little further. It is on record that about a century ago

a doctor wrote: "Among the multitude of causes which concur to impair health and produce disease, the most general is the improper quality of our food. This most frequently arises from the injudicious manner in which it is prepared; yet strange, passing strange, this is the only one for which a remedy has not been sought." Now, it is pointed out, it is generally recognized among those who have studied the subject that proper food, properly cooked, means more than half the battle won in the fight against consumption. What, therefore, could be more fitting than that the Secretary of the Society of Medical Officers should, at the suggestion of Dr. F. S. Toogood, organize lectures on "Common-Sense Cookery in Health and Disease," at which practical demonstrations will be given of the hygienic preparation of mixed diets such as are within the reach of the working classes? Special attention will be paid to suitable diet for the sick poor and those predisposed to tuberculosis. They will take place in the Society's lecture-room; and though they are primarily intended for health visitors and voluntary health workers, it is gathered that others interested in the subject will be welcomed. During next month, Dr. R. A. Lyster, Dr. R. Dudfield, Dr. F. S. Toogood, Dr. Joseph Priestley, and the Secretary of the Society (Mr. William A. Lawton, Barrister-at-Law) will lecture on different points. Visits will be made to typical street markets and to cold storage depôts, and practical illustrations will be given in every instance. The series of lectures has been inaugurated by "a poor man's dinner," of which a number of guests were invited to partake. The meal, judging from the comments that have appeared in the public Press, was a remarkably good one, and the cost was still more remarkably small. The dishes were prepared in the gas-kitchen already referred to by Mr. Lawton, who, when not at "work," practices the art of cooking and the, perhaps equally difficult, art of marketing to the best advantage.

A New Gas-Stove.

It has been stated that Mr. Lawton devotes a part of his spare time to the cooking of good food in a proper manner; and this practice has had a sequel, for (recognizing that the choice of the not unduly rich lies between gas and coal) he has devised a gas-stove for cheap cooking, which he intends using in connection with the lectures.

There are many striking points about this stove; but the outstanding features are its simplicity, portability, and cheapness. It is designed to meet special requirements, and to be used in connection with casserole cooking; and it is not intended to supplant other forms of gas-cooking appliances. The stove which the writer was invited to inspect has, it was explained, been in use by Mr. Lawton experimentally—and satisfactorily—for the past three years. It is arranged, though not fixed, in a neat cabinet, which is meant to be a builders' fixture. That is to say, to be built-in to the fireplace, with ventilation up the chimney, so as, in regular use, to meet the "no fume" demands of the doctors. The cabinet is very suitable for a flat, or the *ménage à deux* of the French; for there could be no objection to fitting it in the living-room. Sufficient space remains beside the stove for a sink, while underneath ample cupboard accommodation is provided.

The main idea was to design a demonstrating stove, and this has been done with complete success, inasmuch as it is possible during the whole operation to get a view of what is going on—an advantage from the point of view of both the audience and the cook. The doctor's requirement of absolute cleanliness has also been kept in mind all along—the whole thing can be taken to pieces in a few minutes. As to simplicity, the experimental stove was put together by Mr. Lawton and his man; and the portability will be understood when it is remarked that the complete thing, including the necessary flexible tubing, will go into a despatch case (say) 14 inches by 12 inches, and 2 or 3 inches deep. The top and bottom consist of what are practically two steel grids with centre supports to hold them in position. Between these supports runs the atmospheric burner, the peculiarity of which (from a gas-cooker point of view) is that the seven holes are ¼ inch in diameter. This burner is said to give a perfectly blue bunsen flame of intense heat. The stove is divided into two parts in the centre by an ordinary penny asbestos mat, the bottom of which rests along one side of the burner, which can be revolved in such a manner that the gas-flame impinges slightly on to the asbestos, which deflects the heat on to whatever article of food may be suspended in front of it. This asbestos mat, it is found, will last months and months, and everything gets heated up almost immediately. Tests carefully taken with a thermometer, it is learnt, show that the radiation is excellent. Suspended from the top bars are sliding bars with notches, in which a skewer holding the meat, &c., rests, so that one has the old-fashioned method of cookery with a spit. The "spit," by means of the sliding bars, and the notches mentioned, can, of course, be placed in any position, and near to or away from the source of heat.

It should be mentioned that Mr. Lawton has protected his invention in the Patent Office, and that, though the experimental stove has one or two screws in it, future ones will be made without any nuts or screws whatever. When cold all the bars, &c., will be loose, to facilitate cleaning, and when heated-up they will be held together by expansion. The apparatus, when in use, can be enclosed within two tin sides, which will be arranged with hinges, so as to fold up flat. There is also an arched piece of tin to go over the top, which enables one to keep an eye on the cooking all the time, and also permits the heat to pass across the top bars to the other side of the asbestos pad. Thus on one side of the asbestos there is a strong heat for roasting or grilling, and on the other side a lower heat, sufficient for (say) a custard; while there is also heat available for utilization on the top of the stove. If desired, it would, of course, be possible to have the stove larger, with two burners, to enable meat suspended in the centre to be roasted on both sides at the same time. But when stamping is used, Mr. Lawton calculates that a stove can be made for a very few shillings which will be of a quite practical size for modest requirements. It could, no doubt, be made into an elegant little breakfast stove for a bachelor; while from the medical point of view its extreme portability is a matter worthy of consideration. For instance, a sick nurse might be called in to attend a poor case in a house where gas, but no cooking appliance, was available, and she could take the stove with her in a small case, put a penny in the meter slot, attach the flexible tubing to a fitting, and cook a dainty meal for the patient.

The Casserole System of Cooking.

As an artist in cooking, Mr. Lawton makes use wherever possible of the casserole system, and in the course of an interesting conversation he explained the almost unlimited scope for the employment of this method, as well as its advantages. Hitherto, the writer gathered, the principle has been less extensively adopted than might otherwise have been reasonably expected, on account of the high prices charged in this country for the French fire-proof ware that is used in the operation. Now, however, the French manufacturers have combined to set this matter right. A warehouse has been opened in Holborn, and the Anglo-French Fire-Proof Syndicate are making arrangements to enable the Londoner to obtain their specialities from his retailer at practically Paris prices, which he has not so far been able to do. The knowledge that French fire-proof cooking-pots, free from lead, can be bought at prices anywhere between the extreme limits of 2d. and 30s., will no doubt lead to a wider demand for them on the part of English cooks. Of course, they require in use somewhat more tender handling than metal utensils, but the degree of care that needs to be exercised is no more than might fairly be expected from a properly trained servant.

CANADIAN AND MICHIGAN GAS ASSOCIATIONS.

A Fraternal Gathering.

The annual meeting of the Canadian Gas Association was held in Toronto on the 3rd and 4th inst., under the presidency of Mr. Arthur Hewitt, the General Manager of the Consumers' Gas Company of Toronto. In addition to the President's Address, the following papers were upon the programme:

"Reconstruction of an Old Retort-House," by Mr. Howard E. Mann.
"Suggestions for Increasing the Industrial Use of Gas," by Mr. H. E. G. Watson.
"Medium High-Pressure Gas Distribution in Montreal," by Mr. C. H. Osler.
"Gas *versus* Coal for Water-Heating Appliances," by Mr. C. W. Allman.
"Commercial Lighting in Toronto," by Mr. W. Fuller.
"Consumers' Accounting and Records System," by Mr. J. J. Armstrong.

It was arranged that at the close of the business the members and their friends should inspect the display of gas appliances at the Canadian National Exhibition; and the next morning they were invited to be the guests of the Entertainment Committee, who, through the kindness of Mr. Hewitt and the Directors of the Consumers' Gas Company, provided conveyances to take them to pay a fraternal visit to the members and friends of the Michigan Gas Association, who were holding their meeting on the steamer *Rochester* in the docks of the Richelieu and Ontario Navigation Company—the entire party to join in a sight-seeing excursion. Later in the week there was to be a united boat trip to Ogdensburg (N.Y.).

The meeting of the Michigan Association was held from the 4th to the 6th inst. This year's President is Mr. F. W. Blowers, of Kalamazoo (Mich.). The following papers were to be read:

"Gas *versus* Coal for Water-Heating Appliances," by Mr. C. W. Allman.
"Increasing Sales of Gas Appliances by Special Campaigns," by Mr. Philip Buckley.
"The A. B. C. of Gas Company Advertising," by Mr. R. Fowler.
"Variation in Heat Units in the Condensing and Scrubbing of Coal Gas," by Mr. A. I. Snyder.
"The Electrical Separation of Tar from Coal Gas," by Professor A. H. White, Mr. John W. Hacker, and Mr. Frank Steere.
"Large Profits in Small Economies," by Mr. T. J. Weber.
"Gas Collections," by Mr. F. J. E. O'Hara.

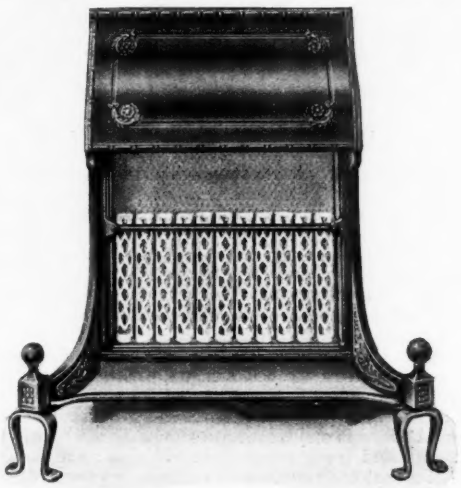
The Council of the Institute of Chemistry are making an endeavour to raise a fund for new buildings; and it is felt that companies and firms and others interested in the promotion of higher education in chemistry and allied sciences will welcome an opportunity of showing their practical and material sympathy with the aims and objects of the Institute. Contributions may be forwarded to the President of the Institute at 30, Bloomsbury Square, London, W.C.

GAS-FIRES DE LUXE.

New Productions by the Richmond Gas-Stove Company.

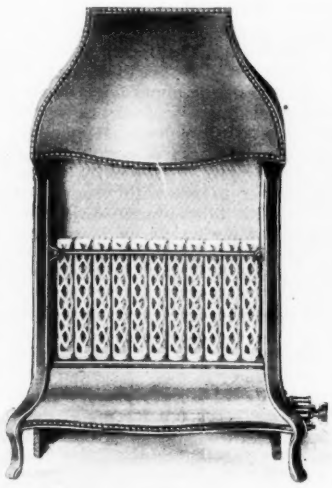
THE evolution of the applications of gas is an interesting study; and in this evolution the makers of appliances for the utilization of gas have borne an important part. To take as an exemplification only one branch—that of domestic gas heating. The gas-fire obtained at the outset a greater adoption in the better middle-class houses than in any other of the dwelling-places of the community; but, as time progressed, application advanced in both directions, and gas-fires are now found in the houses of the wealthy, and they are not unknown, where gas is cheap, in the houses of the poorer class. But in the houses of those who are generously favoured, shillings are not of much importance; and there they want the heating appliances to share in their external appearance in the luxurious or artistic furnishings of their rooms. There is to-day a popular flow of appreciation of the efficiency of gas-fires where the price of gas renders it a not too costly fuel; and this appreciation has extended to Mayfair and other residential areas where the general characteristics of the houses require gas-fires of better external description than those that are generally adopted. If such fires cannot be obtained, then that is sufficient reason for the occupants of the houses in view to turn their backs on gas-heating. The development of demand has to be met, and, by the means of meeting it, one may be sure that further development will ensue.

Let us go back to trace the history of the series of Richmond fires that are now on the market, and known as the "Period" series. It was some five years since that the firm brought out what is known, wide and far, as the "A.B.C." series. The object of this series was to ensure the standardization of every part, so that one could have three distinct designs—a round top fire for the register grate, a square top one for the tiled-sided or modern grate, and a flat top one, with boiling-ring on top, for nurseries, bedrooms, and so forth. These three designs were considered all that was necessary for the principal class of business that was being done at that time by gas companies and local authority gas departments. The purpose of the "A.B.C." series was an economic one. Instead of multiplying designs, and causing customers to keep many patterns in stock, these three gas fires, with their interchangeable casings and internal parts, it was intended, should meet the ordinary run of business, and be especially suitable for simple hire. The favour the series has received, the firm inform us, has more than justified expectation; for they know that with them simple hiring has been considerably developed by many gas undertakings, and that on economical lines. The economy is seen when it is stated that only four sets of parts are wanted for four different sized fire openings; and yet there are made available fifty kinds of finishes and sizes.

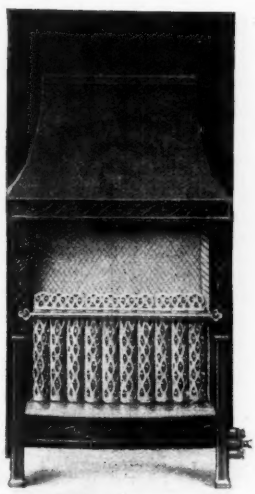


The "Renaissance."

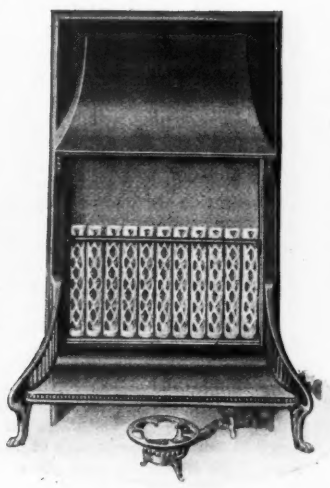
The "Adam."



The "Flambeau."



The "Chippendale."



The "Louis."

The tendency of the times is for dwellings to become more artistic, and their appointments in keeping. The fireplace itself has had part in this tendency. Hence one cause of the gradual growth of the desire for gas-fires in (so to speak) a higher grade setting, in addition to the desire of the wealthy to adopt gas-fires, if they can find what they require in the matter of design and finish compatible with the luxurious furnishings of their rooms. If those who have adopted electric lighting can be secured as consumers of gas for heating purposes as well as for cooking, there will be compensation for the loss of their lighting business The Richmond Stove Company believe, with confidence, that the "Period" series of fires will comply in every way with the demand that exists, and will help, by their presence where fitted, to create further demand. Almost every fireplace now in good class houses and modern middle-class dwellings has tiled sides and hearth, or is a complete tiled recess. For such fireplaces, the gas-fires with heavy iron casings are not consonant with the artistic ideal. In the "Period" series (which is comprised of the "Renaissance," the "Flambeau" and the "Louis," each made in four sizes of fire openings, 12-inch, 14-inch, 16 inch, and 18-inch), there is a narrow strip of framework at the sides, so that practically on a front view little more than the fire, canopy, and top are exposed. The result is that (say) the 16-inch fire can be placed between the tiled wings of a fireplace, or immediately in front of the coal grate, without overhanging any of the tiled portion, or without showing an undue amount of cast-iron work. Thus the fire really looks like an integral part of the fireplace, instead of merely a product of second thought. In this external structural feature, so far as we are aware, the series is unique. There is a

complete departure from the impression of a large mass of iron-work with a fire opening in the middle. One has but to look at the finish, too, to see that there is a distinction about the fires that is absent from some of those to the defect of which in this respect we have become almost unconscious through familiarity. It is, however, this new finish that will appeal to the class of consumer for whom the "Period" fires are intended.

In these fires the principles adopted by the firm in the "A.B.C." series in regard to internal construction and interchangeability have been followed. Only four sets of parts are needed for any renewals that may be required from time to time in the whole series, which comprises, 12, 24, 36, and 48 different finishes and sizes. As to the finishes, the fires are produced in art black (which is a speciality of the firm), in copper finish (which is useful in rooms where bronze fittings or other ornamentation is the fashion), in armour bright (which is pleasing in rooms where there are steel surroundings or fittings or antique decoration), and in porcellanite enamels (which, in passing, it may be mentioned are of a higher standard than ever, and in their tones have been improved) to harmonize with bedroom decoration, or for use in other rooms where a coloured finish is preferred. As to other details, every gas fire is now sent out with a duplex burner, in order that consumption and temperature can be adjusted to need without loss of fire efficiency. The taps and fittings are finished in the same manner as the casing of the fire, so that the eye is not arrested by any disparity in this regard. For instance, brass tap and fittings are used for the porcellanite finished casings, oxidized silver for armour bright ones, gun metal for art black ones, and copper bronze for art copper finished casings. The smooth finish of these taps and fittings makes them compatible with the general high tone that there is about the new series of fires; and there is no question special attention has been bestowed upon them.

We now come to the fuel. The fuel—its design and composition—has been one of the first considerations of Mr. H. Hartley, M.Sc., the new chief of the Richmond Company's laboratories at Warrington. In work of this and cognate character, Mr. Hartley's training and experience will stand him in good stead. Both training and experience have been of a special and extended order. We need only mention here that Mr. Hartley received part of his training at the School of Chemistry at the Manchester University, where he was awarded several exhibitions; and afterwards he went to Norway and Canada on research intent. Subsequently, on returning to this country, he was appointed to the Gas Institution Fellowship at Leeds University; and there he worked, in collaboration with Dr. Bone on the theoretical aspects of the catalytic action of surfaces in promoting gaseous reactions. His appointment with the Richmond Stove Company dates from early this year. The considerable advance in radiant efficiency that the firm are obtaining in their new fires is a first result. The fuel that is now being applied to the new series, as well as the "A.B.C." series, of fires has been designed to fit the flames, and to promote radiant efficiency. The fuel tapers to the top. Internally at the back are projections, which increase in length as they approach the top; and the design of the fuel is more open in front, without any degradation of strength, in order that there shall be as little impediment as possible to the radiations from the back of the fuel. Then another feature is that the art black finished "Period" fires are fitted with an electro-plated fender, so curved as to act as a reflector—the result being that, on looking at a fire, the incandescent surface appears to be considerably extended; and there is something very cheery about it. There is also about the fuel a clean incandescence which is extremely pleasing.

Reversible Connection for Flue-Pipes.

One more point. The flue openings at the back of the fires are reversible; so that they can have a horizontal elbow-piece attached, or if the circumstances of location requires it, by taking out two screws, the flue-opening can be reversed, and so be placed at an incline. The flue-openings are wide, with curved ends, and have been proportioned in each size of fire to completely carry away the products of combustion. The form of the fire brick, too, has been carefully designed in relation to the flue-opening, as has also been the canopy.

As many of the foregoing improvements as are applicable have been incorporated in the new designs of dog grates which were introduced by the firm last season, and for which there has been a good demand for tiled recesses. A companion to the new series of "Period" fires is an elegant fire known as the "Chippendale." This is intended for permanent installation as a gas-fire grate instead of a coal-fire grate. It is made in one size, with a 16-inch opening, and of suitable dimensions for the designed purpose.

FOR THE LIGHTING SEASON.

Messrs. J. & W. B. Smith.

A VISIT to the Farringdon Road premises of Messrs. J. & W. B. Smith convinces one of the necessity for the further show-room space, storage accommodation, and workshop area that the firm have lately acquired. There has been a constant expansion of their business, until existing facilities have become fully utilized; and the confident anticipation that this growth will continue therefore made it imperative that some steps should be taken to meet it. At the present moment, indeed, the greatest activity prevails among the staff engaged in coping with orders for the forthcoming lighting season, which promises to be a very busy one. New patterns of burners, fittings, &c., are always being introduced; and, of course, they require additional room for stocking in adequate quantities and for displaying to customers who make a personal call.

This year, for example, the firm direct attention to quite a number of things that have been added to their list. To begin with burners, there may be first mentioned the new "Silva" shell inverted pattern, made in standard size only. Both the screw of the gas-regulator and the handle of the air-regulator are of non-heat conducting material; and the gas and air mixing chamber and the combustion chamber are specially shaped to ensure a more regular result—the flame, it is said, being of greater intensity, and not so sensitive to fluctuation of pressure. The improved "Briton" burner is in most respects similar to the one just alluded to. The porcelain heat-diffuser is, however, different in shape; and the burner is manufactured in three sizes—bijou, medium, and standard. Both patterns are British made, and are claimed to give a light of 80-candle power with a consumption of 3½ cubic feet of gas per hour. The inverted mantles that are stocked, too, include a new loom woven British made one—"Glasmi Briton XXXX."—for universal and Graetzin fittings. The "Mannesmann" intensive gas-lamp designed for indoor lighting (to which reference has previously been made in the pages of the "JOURNAL"), giving a lighting efficiency of about 300-candle power with a gas consumption of some 7 cubic feet per hour, is meeting with a good demand, as are also the well-known "Silva" and "Graetzin" high-power lamps. Beaded shades, again, in which the firm are showing many new and exclusive designs, are in greater request than ever. To be fixed in positions—such as hall lamps, &c.—where the use of a large globe is impossible, there is specially provided the British made "Briton" pendant burner. In the construction of this burner particular attention has been given to preventing sooting-up, as well as to keeping the products of combustion from entering the bunsen tube.

For factories, warehouses, and other places where anti-vibrators of one kind or another are found desirable in connection with incandescent gas lighting, there is an anti-vibration pendant which is well worth attention, because of the fact that no flexible tubing is used with it. A steel spring joins the upper and lower portions of the fitting in the usual manner; but instead of using flexible tubing, which it is generally recognized has disadvantages, the gas-way is provided by an ample length of coiled copper tube, which is very sensitive, and will "give" sufficiently to meet any requirements. A suitable burner to use with pendants of this character is the "Glasgow." This takes standard sized mantles, and has been specially designed for such places as anti-vibrating fittings would likely be required in. The form of anti-vibrator alluded to is also convenient for employment with lamps for high-pressure lighting.

One other fitting which certainly calls for special mention is the "City" inverted cluster pendant for indirect lighting. In this there are two "Silva" angle burners, beneath which is a special "Pearlite" bowl, designed to throw a great portion of the light on to the ceiling, from which it is reflected. The effect when using this bowl is most pleasing—the light being of a soft and even character. The adjusting arrangements of the burners are readily get-at-able, being above the top of the bowl; while the bottom portion of the fitting, including the bowl, can be lowered (to rest on a spring) by the simple turning of a thumb-screw—thus giving easy access to the burners themselves for cleaning and and maintenance purposes. The lighting efficiency claimed for this lamp is about 125 candle-power per burner; each burner consuming 3½ cubic feet of gas.

Another matter which, in a few final words, may be alluded to is the fact that all the operations of relacquering, oxidizing, gilding, cleaning, and repairing are carried out by the firm on their own premises. This must make for promptness in the execution of orders. The same remark applies to glass cutting, sand-blasting, silvering, bevelling, &c. Among various things, globes of all sorts are dealt with, and a large business is done in making advertising signs for gas-lamps.

"Electricity for Everybody" is the title of a popular handbook by Mr. R. Borlase Matthews, Assoc.M.Inst.C.E., who deals with the uses of electricity in the home and in business. This is the second edition of the work, and the preparation of it afforded the author an opportunity of revising and amplifying the text. Illustrations are given of the appliances used in the supply of electricity for lighting, cooking, heating, and power; and there is a general index. The book is published by "The Electrical Press, Limited," 37-8, Strand, W.C.—price 5s. net.

THE GAS-TURBINE.

At the Dundee meeting of the British Association on Monday last week, a discussion took place on the Gas-Turbine.

Dr. DUGALD CLERK said: Engineers engaged in the development of the internal combustion engine have long recognized that great advantages would flow from the substitution of rotary for reciprocating movement; and, accordingly, many attempts have been made to produce a commercial gas-turbine. So far, no attempt has succeeded; the practical difficulties have proved to be too serious. Much useful knowledge, however, has been obtained by able and adventurous experimenters; and we are now in a position to consider the difficulties afresh, with some experimental data at our disposal.

Most of the early experimental work upon any great and difficult problem must necessarily be of the forlorn-hope type, so far as concerns the attainment of commercial success. This is shown by the history of all great inventions. Pioneers in work of this kind should be highly honoured by engineers; and one of the names entitled to an honourable position is that of the late M. Réné Armengaud, who, together with M. Lemale, built in 1906 two experimental gas-turbines of the constant-pressure type, one of which developed 30 B.H.P., and the other 300 B.H.P. A gas-turbine of the explosion type, without compression, was built by M. Karovodine in 1907. It gave 1·6 B.H.P. at 10,000 revolutions per minute. Recently the explosion type has been studied by Mr. Hans Holzwarth, who has built a gas-turbine of a rated power of 1000 H.P., the wheel of which rotates at 3000 revolutions per minute. Mr. Holzwarth has written an interesting book upon his work, in which he discusses the numerous scientific and practical points of the explosion type gas-turbine in a very able and complete way.

In a paper written by M. Réné Armengaud, and published in "Cassier's Magazine," in January, 1907, the inventor gives an interesting account of his experimental work on the constant-pressure turbine. A small experimental machine, it appears, was made by altering a De Laval steam-turbine of 25 H.P., so as to operate it with compressed air instead of steam. The air was supplied at the desired pressure from a high-speed compressor, whose efficiency had been carefully determined. The compressed air was passed into a combustion chamber with measured quantities of gasoline vapour, and the mixture was ignited as it entered the chamber by an incandescent platinum wire. The combustion was then maintained continuously at a constant pressure. The combustion chamber was lined with refractory material, ultimately carborundum; and a temperature of about 1800° C. was maintained at the flame. But the mean temperature of the discharging gaseous contents of the chamber was reduced to 400° C. by the admixture of steam under pressure. This steam was generated in a coil embedded in a portion of the combustion chamber. The working fluid thus consisted of a mixture of products of combustion and steam at the low temperature of 400° C. The constant pressure maintained in the combustion chamber was about 10 atmospheres, and the hot gases were allowed to expand through a conical De Laval jet in which the expansion caused high velocity, and reduced the temperature of the fluid. At this reduced temperature and high velocity, the gases impinged on the De Laval wheel, and rotated the wheel in the same way as steam would have done. The experiments showed that under these conditions the total power obtained from the turbine separate from the compressor was double that necessary to drive the compressor. In the large 300 H.P. turbine the first part of the combustion chamber was lined with carborundum, backed by sand; the second part was surrounded by a coil through which water was circulated. The water kept the temperature of the combustion chamber within safe limits; and after absorbing heat, it passed also around the jet nozzle, and was discharged into the passage leading to the jet, and there converted into steam by the hot gases. A mixture of products of combustion and steam thus impinged on the turbine wheel. The expanding jet was arranged to convert the whole of the energy into motion before the fluid struck the wheel. The temperature was thus reduced to a minimum before the gases touched the blades. Notwithstanding this, the wheel itself had passages through which cooling water flowed, and each blade was supplied with a hollow into which water found its way. In the large turbine, the compressor was mounted on the turbine spindle. It was of the Rateau type, and consisted of an inverted turbine of four stages, which delivered the compressed air finally to the combustion chamber at a pressure of 112 lbs. per square inch absolute. The efficiency of this turbine compressor was found to be about 65 per cent. The total efficiency of the combined turbine and compressor was low, as the fuel consumption amounted to nearly 3·9 lbs. of petrol per brake-horse-power-hour. This consumption was, of course, much too high to permit of the turbine having any chance as a commercial engine. An ordinary petrol engine with a moderate compression can readily give its power at the rate of 0·5 lb. of petrol per brake-horse-power-hour; and even assuming all practical difficulties overcome, so far as running was concerned, a consumption of six times that of the ordinary petrol engine for equal power was not sufficiently good for practice. The combined turbine and compressor was stated to have run at 4000 revolutions per minute, and to have developed 300 H.P. over and above the negative work absorbed by the compressor. Notwithstanding the high fuel consumption, it was a notable achievement to obtain, under any circumstances, 300 H.P. from an internal combustion turbine; and had it not been for the untimely death of M. Armengaud, this turbine might have been greatly advanced. So far as I know, however, the experiments upon the constant-pressure turbine have not been continued.

The explosion-gas turbine invented by M. Karovodine was exceedingly ingenious. It contained four explosion chambers, having four jets actuating a single turbine wheel, which wheel was of the De Laval type, about 6 inches in diameter, having a speed of 10,000 per minute. The explosion chambers were vertical, and had a water-jacket surrounding the lower end. The upper portion contained the igniting plug on one side, and the discharge pipe connecting with the expanding jet on the other. In the lower water-jacketed part there was provided a circular cover, held in place by a screwed cap. This circular plate was perforated with many holes, and it carried a light steel plate valve of the flap or hinging type. The valve was pulled down by a spring contained within the admission passage. The spring could be adjusted; and the lift of the valve was regulated by means of a set-screw passing diagonally through the water-jacket. Air was admitted at one side by a pipe leading into the valve inlet-chamber; and a corresponding passage or pipe admitted petrol and air or gas to mix with the air before reaching the thin plate valve. Adjusting contrivances were supplied in both air and fuel ducts. To start the apparatus, an air blast was forced through the valve, carrying with it sufficient petrol vapour to make the mixture explosive. The electric igniter was then started, and the spark kept passing continuously. Whenever the inflammable mixture reached the upper part of the combustion chamber, ignition took place; and the pressure rose in the ordinary way, due to gaseous explosion. The gases were then discharged through the pipe and nozzle on to the De Laval wheel. The cooling of the flame after explosion and the momentum of the moving gas column reduced the pressure within the explosion chamber to about 2 lbs. per square inch below atmosphere. Air and petrol vapour then flowed in to fill up the chamber; and as soon as the mixture reached the igniter, explosion again occurred. In this way, a series of explosions were automatically obtained, and a series of gaseous discharges were made upon the turbine wheel. Diagrams taken from the explosion chamber showed a fall in pressure during suction of 2 lbs. per square inch; ignition occurred while the pressure was low; and the pressure rapidly rose to about $1\frac{1}{3}$ atmospheres absolute. The pressure propelling the gas column and jet was thus only 5 lbs. per square inch above atmosphere. The pressure rapidly fell, and the whole process was repeated again. According to the diagrams taken, a complete oscillation required about 0·026 second; so that about forty explosions per second were obtained.

Mr. Suplee, in his interesting work upon the gas-turbine, describes experiments made by M. Baudezat on a turbine of this type. The volume of one chamber was 230 cubic cm. Each nozzle was 3 metres long and 16 mm. diameter. The wheel itself was 150 mm. in diameter, or 5·9 in. It made 10,000 revolutions per minute, corresponding to a perimeter velocity of $78\frac{1}{2}$ metres, or 258 feet per second. At the time the diagrams were taken, the air drawn into the chamber was measured by a meter, and the petrol consumed was also measured. The brake-power was determined by a Prony brake. The data and results obtained were as follows:

Air consumed per hour	62·5 cubic metres = 80 kg.
Petrol	6·5 lits = 4·7 kg.
Length of brake arm	46·4 cm.
Weight on brake	248 grammes.
Speed	10,000 revolutions per minute.

This experiment gave 1·6 B.H.P., and Mr. Suplee takes the wheel and journal friction as 0·5 H.P., so that the equivalent power was 2·1 I.H.P. The fuel consumption was nearly 6·5 lbs. per brake-horse-power-hour. The little explosion turbine thus consumed more than double the petrol required per horse-power as compared with the large constant-pressure turbine.

The large Holzwarth gas-turbine also operates on the explosion principle, but the construction and action are very different from those of M. Karovodine. The turbine in general arrangement outwardly resembles the Curtis steam-turbine, in that the turbine wheel rotates in a horizontal plane, the spindle or shaft is vertical, and a dynamo is mounted on the spindle above the turbine. In the Holzwarth turbine, ten combustion chambers are provided, each of a pear or bag shape. They are arranged in a circle around the wheel, and are cast so as to form the base of the machine. The wheel is of the Curtis type, with two rows of moving and one row of stationary blades. Mr. Holzwarth does not give the dimensions of his turbine wheel; but from the drawings and some of the velocities given by him, it appears to be about 1 metre in external diameter. The lower part of each combustion chamber carries gas and air inlet valves, and the upper part carries a nozzle arranged to cause the gases to impinge on the first row of moving blades. This nozzle is connected to, and disconnected from, the combustion chamber by means of an ingeniously operated valve. The explosion chambers are charged with a mixture of gas and air, which appears to attain a pressure of about two atmospheres within the chamber before explosion. The air and gas are supplied under sufficient pressure from turbine compressors actuated by steam raised from the waste heat of the explosion and the gases of combustion; so that whatever work is done in compression is obtained by this regenerative action, and does not put any negative work upon the turbine itself. The combustion chambers are fired in series, by means of high-tension jump spark ignition. The action is as follows: Air is caused to

flow through the combustion chamber to sweep out the products of the previous explosion, and also to assist in cooling the wheel by impinging upon it. The nozzle valve is closed, and then gas is forced in to produce an explosive mixture. The gas and air valves are both closed, and the electric spark is passed. The pressure of the explosion opens the nozzle valve, and the gases acquire velocity within the nozzle, the temperature falls, and the high velocity lower temperature gases impinge on the wheel. As the pressure falls, the nozzle valve gradually closes, but remains open until the scavenging and cooling current has been passed through. When closed, the charging proceeds and the explosions occur as already described.

Many practical difficulties were found, but ultimately the turbine was operated by producer gas made from coke. It was found that when all ten chambers were in operation, the maximum pressure on explosion which could be obtained with the best mixture was only about 45 lbs. above atmosphere. Using five combustion chambers, the best explosion pressure varied between 80 lbs. and 90 lbs. per square inch above atmosphere; while with four chambers, the highest result obtained was 105 lbs. per square inch. So far as I can understand Mr. Holzwarth's experiments, the highest power actually obtained was about 160 B.H.P. In this experiment ten chambers were used, giving 16 H.P. each. With five chambers, a total of 145 H.P. was obtained, at 29 H.P. per chamber; and with four chambers, the total was 121·6 B.H.P. at 34 H.P. per chamber. With ten chambers in operation the power fell to about one-half per chamber, as compared with four chambers. From these experiments, Mr. Holzwarth came to the conclusion that the successive explosions interfered with each other, and prevented proper charging and action. Obviously with the arrangements used in the experiments, ten chambers were inadmissible.

According to an interesting curve found at p. 149 of Mr. Holzwarth's book, an explosion pressure of 105 lbs. per square inch above atmosphere should have given in the turbine about 95 B.H.P. per chamber. With the ten chambers in operation, this would justify the rated power of 1000 H.P.; but the actual power obtained per chamber, even with only four chambers in operation, was only about one-third of this. The weight of the turbine without the dynamo was 25½ tons, which, at the 1000 H.P. rating, amounted to about 57 lbs. per horse-power. The weight of the whole machine, with dynamo and economizer, with its steam-driven blowers, was 53½ tons, or 120 lbs. per brake-horse-power total. These weights, after allowing for the necessary gas-producers, do not improve upon ordinary reciprocating steam-engine weights, including boilers, even on the higher rating; but with the lower power actually found by experiment, the weight per horse-power becomes impracticably large.

Mr. Holzwarth appears to claim a possible conversion of 30 per cent. of the heat supplied to the turbine into mechanical energy at the turbine shaft; and I understand that he has made this claim for the present turbine in its imperfect state. There is some mistake about this, because even on the air standard cycle, taking the approximate compressions used, and assuming expansion to atmosphere, the efficiency is too low to permit in practice in a reciprocating engine with its smaller heat losses more than about 15 per cent. With the larger turbine losses, the theory of the Holzwarth machine does not appear to me to permit more than a 10 per cent. heat conversion; and so far as I am able to understand Mr. Holzwarth's results, his actual conversion is much less than this.

Notwithstanding the unsatisfactory results of these experiments, Mr. Holzwarth is to be congratulated upon his courage and perseverance in attempting to solve a very difficult problem on so large a scale. His work is not lost, because it supplies much-needed data which will enable either himself or other engineers to attack the problem afresh with better chances of success.

Undoubtedly, the modern development of the steam-turbine—displacing as it does so successfully all the larger reciprocating power units—and the difficulties of the large cylinder gas-engine, apply an ever-increasing pressure to engineers desiring to use internal combustion for very large power units. The existing internal combustion engines are quite satisfactory for small and moderate power units; but the weight increases so rapidly with increase of cylinder diameter that large units such as 20,000 H.P. per shaft, easily attained by the turbine, have proved quite impossible for the reciprocating gas-engine. In order to apply internal combustion for the purpose of such large units, it appears to me to be necessary to dispense with the cylinder piston and crank. I fear that this cannot be done on the lines of either constant-pressure or explosion turbines here shortly discussed. Difficulties which I pointed out to the Junior Institution of Engineers in 1905 still remain; and notwithstanding the great ability from both the scientific and practical points of view of the inventors who have experimented with the subject, the results obtained only appear to show that progress can hardly be expected on the lines of flame impinging on turbine blades, either in impulse or reaction turbines. Several engineers have suggested the use of explosion to give water velocity, which velocity actuates a water-turbine of some form. Mr. Humphrey, in his paper to the Institution of Mechanical Engineers, figures such a combined gas and water turbine; and although in the form suggested by him the conditions required too cumbrous a machine, yet it does seem to me that the more hopeful line is to use explosion and expansion to give water velocity, and so avoid all heat difficulties in the turbine part of the apparatus. It is true that such an arrangement still necessitates a reciprocating mass of water; but it will probably be found that great gain in weight can be obtained by the suppression of the piston, connecting rod, engine frame, and crank. This line seems to me a more hopeful one than any scheme involving the direct contact of flame with turbine blades.

[Dr. Dugald Clerk concluded by saying he had just received a wire from Mr. Holzwarth, stating that he had, since the results mentioned above, succeeded in obtaining 450 B.H.P. from the 1000 B.H.P. rated turbine, instead of the 160 B.H.P., with an efficiency of 23 per cent.]

Discussion.

Sir William White, K.C.B., F.R.S., said they must all agree with the statement made by Dr. Clerk as to the necessity for substituting the rotary principle for the reciprocating principle, more especially after the experience with steam. There were, however, inherent difficulties in the way, and he very much regretted that Sir Charles Parsons was not present to speak with regard to the matter. It was one to which he had been giving attention for a long time. It was evident also that until the gas-engine, on either the reciprocating principle or the rotary principle, could be made use of in large units, its extended employment must be very limited. Further, until they could get rotary gas-engines in which the materials would stand the temperatures involved, or make some arrangement by which the vanes of the wheel would not be affected by these temperatures, application of these gas-engines must be limited, though in saying this no one more fully appreciated than himself the extreme value of the pioneer work which was being done.

Professor Silvanus P. Thompson, F.R.S., pointed out that a temperature of 1800° C. was obviously impossible for the application of the hot gas to direct metal. The temperature to which apparently the reduction was effected by explosion in one of the most interesting cases was 400° C., which was a little below red-heat, and obviously the metal would not stand a higher limit without being made impracticable. It was extremely interesting to note the use of a carborundum lining in the explosion chamber in one instance mentioned by Dr. Clerk, and he would like to know a little more about this. Some of them had had to work with this material in various ways; but he doubted whether it could possibly stand for any length of time (say a few weeks) the effect of the explosion against its surface. Further, he could not understand how a sand backing, as suggested, would help it.

Dr. Dugald Clerk replied that in this particular type there was no explosion—the pressure remaining constant at 100 lbs. There was continual combustion by high pressure, but no explosion. He quite agreed that carborundum would not stand the high pressures, and it had been found that even the effect of the abrasion of the flame passing over the surface was enough to carry some of the carborundum into the valves.

Professor Thompson (continuing) said that some of these experiments had been carried out in England, and others in foreign countries. It was within the knowledge of most of them that Mr. S. Z. de Ferranti had been experimenting for a long time in this direction. Was anything known of the results of his work?

Sir Alfred Ewing, F.R.S., after referring to the enormous advantages of the turbine type, and suggesting that it would be a very retrograde movement indeed if they were obliged to go back to the reciprocating engine, said that a solution of the problem was more likely to be reached by finding some material for the blades which would stand the necessary mechanical strains, and at the same time the high temperature. At present, however, he could not suggest any such material.

Dr. Mond referred to the experiments of Mr. Humphrey in connection with the gas-turbine, in which he had tried to work a gas-engine with large cylinders side by side, connected by a small cylinder, in which was a moving piston chamber, where the explosion took place. The effect of the explosion taking place between the two large cylinders was to obtain an explosion in a chamber which could be as hot as possible, and yet allow the gases to expand as quickly as possible with a minimum of cooling. This engine, however, required another engine to turn it round. He had tried to solve the problem in another way with equally small success—viz., by trying to use the rotary type of steam-engine, as made by Messrs. Heenan and Froude. This allowed the complete Otto cycle to be performed; but the difficulty about it was that it could not be made tight. If it were possible to overcome this purely mechanical objection of making the thing tight, it would be possible to give the rotary engine the full efficiency of the reciprocating engine; and he was sorry that no one else had been working in the same direction.

Mr. F. Samuelson spoke as a supporter of the steam-turbine, which he claimed, by increasing the temperatures and steam pressures, could be made to give equal, if not better efficiencies than gas and oil engines.

Dr. Dugald Clerk, in replying to the points raised in the discussion, said that very many difficulties had been found to crop up in using higher steam pressures and temperatures with the steam-turbine; and it was for these reasons that greater progress had not been made in this direction. Dr. Mond had given an interesting account of Mr. Humphrey's experiments, but he had not mentioned the one in which water was used for impelling the wheel. There were great difficulties in getting any form of rotary motor; and so far as experience at present went, there did not seem any likelihood of them being overcome. He only wished that Sir Alfred Ewing would speedily discover some material such as

he suggested. In reply to Dr. Thompson, Dr. Clerk said that Mr. Ferranti had been assiduously experimenting upon a modified gas-turbine, which was a sort of gas and steam turbine; but as Mr. Ferranti did not wish to publish any of his results yet, he had not mentioned his name. There was no doubt, however, that Mr. Ferranti's results would be published very soon. A good many other experimenters had also been at work in this country with regard to this matter; but so far there had been nothing really practical published. He agreed with the extreme desirability of getting rid of the crank if possible, and many engineers who were vitally interested in the reciprocating engine were busy trying to do this in various ways. There was no doubt that the steam-turbine still had a long run before it, and that the gas-turbine, if and when it came, would only share the field with it, the same as the Diesel engine was sharing the field with the gas-engine. A lot was heard about Diesel engine competition; but it was a fact that in one works alone in this country more gas-engines were being turned out in a single year than all the Diesel engines ever since their manufacture was started. The gas-engine could now be made in single units up to 1600 H.P. The enthusiasts of the Diesel engine had been rather forgetting the cost of fuel. He had gone into the subject carefully, and when they considered that in the last five years the total coal raised in the world was about 1100 million tons per annum, and the oil raised was only 45 million tons, and was not increasing materially, it would be seen what a lot of progress the Diesel engine had to make. This output was about 4 per cent. of the total coal, and the amount left for Diesel engine purposes, after deducting that used for lubrication, lamps, petrol engines, &c., was obviously very small indeed. There was no doubt that coal would remain the main source of power for many years to come. In conclusion, he stated that he did not wish his remarks to be in any way pessimistic, nor to give the impression that he did not fully appreciate the efforts of Mr. Holzwarth. As a matter of fact, he admired his work very much indeed, and wished him every possible success. He hoped his own calculations would prove to be wrong, although he could but give the best he could with the information at present available. He would not, however, for a single moment wish to discourage Mr. Holzwarth.

THE NEW PHOTOMETRIC LABORATORY AT THE ZÜRICH GAS-WORKS.

It was mentioned, in connection with the report of the session of the International Photometric Congress at Zürich last year, that the delegates visited the new photometric laboratory at the Zürich Gas-Works. Some particulars of its equipment, so far as it was then complete, were given in the "JOURNAL." Fuller particulars of the laboratory have been published by Herr A. Weiss, the Manager, and Dr. E. Ott, the Chemist, of the works, in the "Schweizerische Bauzeitung," and were reproduced in a recent number of the "Journal für Gasbeleuchtung." We give below a few details from this source.

The establishment of experimental plant for coal-testing, for the Swiss Association of Gas and Water Engineers, at the Schlieren Gas-Works of the Zürich Corporation, rendered it necessary to have a well-equipped photometric laboratory; and the competition between gas and electric lighting made it imperative to have the means of measuring the intensity of different sources of light, the illumination afforded by them in different directions, and their consumption of energy.

The lights to be dealt with may broadly be divided into low-power lights, up to about 200 candles; and high-power lights, from 200 to 4500 candle power. In both classes, upright and inverted burners have to be considered. The ordinary photometer bench, of 100 inches in length, suffices for examining lights of the first class; but the high-power lights require a much greater length. Consequently, the photometer-room has been made 44·3 feet in length, and is equipped with a photometer bench mounted on a carriage, which travels on rails running lengthwise through the room slightly to one side of the central line. A scale on the floor shows the position of the photometer. The height of the room to the ridge of the roof is 29·3 feet, but a shaft, below which the lamps for examination are suspended, has a height of 34·5 feet. This provision avoids vitiation of the air by the high-power lamps, and the light under examination can be set at any height up to 28 feet.

In examining inverted lamps, the light radiated downwards has first of all to be measured; and for this purpose a double mirror, which can be turned about the source of light at such an inclination that the image of the light is projected on to the photometer, is used. In this measurement regard has to be paid to the greater distance travelled by the light, and to the coefficient of absorption of the mirror. This coefficient is found by determining the horizontal illuminating power of the same lamp with and without the use of the mirror. For small inverted lamps, with glasses up to 6 inches in diameter, the mirror can conveniently be attached to the photometer bench. For the larger lamps, a double mirror reflecting apparatus is set up on four vertical rails, which are independent of the bench, and on which its height may be altered as desired. The illumination from the lamps at any height may be measured; and they may be rotated in the horizontal plane in order to determine the mean horizontal illuminating power.

The standards of light used are electric lamps of 1 to 10 hefners (0·9 to 9 candles), which have been standardized against a certified Hefner lamp. They are supplied from two accumulators, and the current is kept uniform by means of controllable resistances and a milliampère meter. These lamps have the advantage, as secondary standards, of affording a steady light, and their illuminating power can be controlled at any time by means of the ampère meter. They remain constant for a long time if always used below the maximum voltage for which they were designed. It is best to work the lamps with constant current rather than with constant voltage. The disadvantage that such lamps give a light which is red in comparison with that of incandescent gas-burners and arc lamps is overcome by using a Bechstein contrast photometer. This photometer allows of the comparison of lights of very different colour without recourse to the flicker principle, which is generally used. The accumulators and electric control apparatus are placed on a table mounted on wheels.

On two of the walls of the room are benches with drawers, supported by brackets, for the experimental meters, governors, a calorimeter, and a shaking machine for testing the strength of mantles. Special attention is given to determining the units of heat taken by the lamps per candle-hour as well as the volume of gas consumed. A meter-proving apparatus is set up in one corner of the room, and on one side are a compressing-gas pump and electrical measuring instruments for measuring electric lamps. A well-ventilated room in one corner of the large room, but completely cut off from it, is used for durability tests of gas and electric lamps. A Bechstein universal photometer, which is self-contained and portable, is used for determining the illumination of street surfaces and the illuminating power of the outdoor lamps brought in to test.

The photometric laboratories on the top floor of the building and the second floor and basement are used as general physical laboratories, and especially for tests of heating and cooking apparatus of different types. At the same time, the chemical laboratory of the works has been reconstructed and re-equipped on a more complete scale than formerly. It contains, *inter alia*, a recording Junkers calorimeter, some Wanner pyrometers, and an electrically-driven pulverizer for coal and coke.

KLÖNNE CHAMBERS AT THE PADUA GAS-WORKS.

The "Proceedings" at the Second Congress of Applied Chemistry, held in Turin in September last year, which have lately been published, contain a report by Dr. Domenico Meneghini on the working of the Klönne chamber settings at the Padua Gas-Works. He says the results fully confirm those obtained at Rotterdam. The following are some particulars from the report.

Anthracite coal from Holmside yielded an average of 32 per cent. of illuminating gas per 100 lbs. of fuel; whereas with the previous retorts only from 29 to 30 per cent. was with difficulty obtained. The quantity of coke used to heat the retorts did not exceed 15·5 per cent. of the coal; and the yield of sulphate of ammonia was considerably greater than before. During the first half of 1909, it amounted to 5 per cent. of the coal; whereas in 1910-11 it was 8 to 9 per cent. The proportion of free carbon in the tar from the hydraulic main was never more than 3·5 per cent.; so that there were no obstructions in the ascension-pipes. Numerous analyses of the gas showed less than 5·5 per cent. of nitrogen, 0·5 per cent. of oxygen, and 2 per cent. of carbonic anhydride. Distillation required 24 hours in the chambers, having dimensions of 20 ft. by 7 ft. by 13 ft., with charges of 4 metric tons of anthracite. The composition of the gas varied at different periods of the carbonizing process; and the heating and lighting powers were not so good during the final hours—the proportion of heavy hydrocarbons and methane being almost *nil*.

To render the quality of the gas uniform, the retorts are charged and drawn twice in the 24 hours—half at seven o'clock in the morning, and the rest at two o'clock in the afternoon. Thus the gasholder is only supplied with 530,000 cubic feet of gas out of the daily production of 777,000 cubic feet. It was not possible to take a single sample of the gas, although Dr. Meneghini was able to note that the variations in composition were insignificant at different hours of the day and night. He found that the heavy hydrocarbons ranged from 3·9 to 5·2 per cent.; the maximum being at seven o'clock in the evening. Methane varied from 37·8 to 38·5 per cent.

Dr. Meneghini closed his report with some remarks in regard to the difficulties experienced in drawing the retorts, due to the use of certain kinds of coal. As it is not possible to prolong the period of distillation or increase the temperature as is done, in such cases, in coke-oven works, he is of opinion that anthracite should not be employed containing more than 6 to 7 per cent. of ash, as he considers that there is a relation between the amount of mineral matter and the density and friability of the coke. He does not share the opinion held by gas engineers that the slight resistance of coke to crushing, and consequently the difficulty in loading, is to be ascribed to an increase in volume of the anthracite during distillation, but most probably to an excessive proportion of ash.

A CONDENSATION PROBLEM.

The following is an abstract translation of an article in the latest number of "Het Gas" by Heer W. Meijer Cluwen, of the Arnheim (Holland) Gas-Works.

A stoppage occurred last June in the 16-inch main between the hydraulic main of the vertical retort-settings and the condenser at the Arnheim Gas-Works. It caused a rapid rise of pressure; but having been localized near a bend with blank flange, the obstruction proved readily accessible, and was removed. It was a hard gritty cake, blackish-grey in colour, brittle and tarry, but free from pitch or thick tar. It dissolved only partially in hot benzol; and the author assumed that the insoluble matter was ash, coal, or carbon, and gave no further heed to the question till several repetitions of the stoppages occurred towards the end of July and the beginning of August. Closer examination then showed that the gritty or sandy constituent was really a very fine crystalline powder, and that not less than 47 per cent. of the original substance was soluble in water, and proved to be ammonium chloride. Some 43 per cent. was soluble in hot benzol, and the balance was presumably coal and coke. The original substance yielded 1·7 per cent. of ash.

The vertical retorts at Arnheim are worked without a hydraulic dip, because, *inter alia*, the great quantity of gas passing through the relatively small and close hydraulic main had been found to cause considerable evaporation, and the level had constantly to be restored by the addition of fresh water, with the ultimate result that the liquor was weakened. With the outside temperature about 64° Fahr., the temperature at the end of the (hydraulic) main was 262° Fahr.; farther on, 232° Fahr.; 207° Fahr. before the obstruction; and 183° Fahr. and lower beyond the blockage. During the winter, with a lower temperature in the main, no stoppage occurred. With four Klönne settings, the temperature 40 inches after the hydraulic main was 163° Fahr.; it was seldom necessary to run water into the main, and no trouble arose.

These facts suggest an explanation of the stoppage in question. It is known that above 660° Fahr., ammonium chloride dissociates into ammonia and hydrochloric acid, which at a lower temperature reunite to a cloud of crystals of ammonium chloride, which is an important constituent of gas liquor. When coal is distilled, the ammonia and hydrochloric acid leave the retort uncombined, but afterwards unite to form a cloud of crystals of the salt, which ordinarily are dissolved in the warm liquor in the hydraulic main. With the vertical retorts without dip, however, this is precluded, and the ammonium chloride, which has a higher specific gravity (about 1·5) than tar, is rapidly deposited with some tar, especially in places where it will not be dissolved by water. Actually, the deposit occurred where the temperature of the gas exceeded 207° Fahr., and where, consequently, water would not remain in the liquid state. The portion of the deposit which was soluble in water was almost wholly ammonium chloride. Ammonium carbonate, hydrocarbonate, and sulphide would not remain at that temperature, and sulphate would be produced only as a secondary product. A published analysis of gas liquor from English coal shows that the liquor from the hydraulic main contains chiefly ammonium chloride, and that from the washer is in great part the carbonate.

Means which suggest themselves for overcoming the trouble in the summer time are (1) the application of lime, which would dissociate the ammonium chloride and combine with the hydrochloric acid, and (2) injection of cold water in such quantity that what remains liquid will dissolve the ammonium salt. Both these methods are known to be efficacious in preventing stopped ascension-pipes. The author hopes to report later whether either of these means answers in the present case.

VENTILATION AND MAINTENANCE OF HEALTH.

In the Address of Mr. Leonard Hill, as President of the Physiology Section at the recent meeting of the British Association, he discussed the conditions necessary to the maintenance of health, and controverted the assumption that air is made deleterious by the introduction of chemical impurities. The following are the portions of the address bearing on these matters.

Mr. Hill commenced by reminding the members that his distinguished predecessor as President of the section raised them to the contemplation of the workings of the soul. He (Mr. Hill) asked the consideration of nothing higher than a stuffy room. Every one thought he suffered in an ill-ventilated room owing to some change in the chemical quality of the air. The good effects of open-air treatment, sea, and mountain air were no less generally ascribed to the chemical purity of the air. In reality, the health-giving properties were those of temperature, light, movement, and relative moisture of the surrounding atmosphere; and leaving on one side those gross chemical impurities which arose in mines and in some manufacturing processes, and the question of bacterial infection, the alterations in chemical composition of the air in buildings where people crowded together and suffered from the effects of ill-ventilation had nothing to do with the causation of these effects. Satisfied with the maintenance of a specious standard of chemical purity, the public had acquiesced in the elevation of sky-scrapers and the sinking of cavernous places of business. Many had thus become cave-dwellers, confined for the most of their waking and sleeping hours in windless places, artificially lit, monotonously warmed. The sun was cut off by the shadow of tall buildings and by smoke—the sun, the energizer of the world, the giver of all things which brought joy to the heart of man, the fitting object of worship of our forefathers. The conditions of city and factory life diminished the physical and nervous energy, and reduced many from the vigorous health and perfectness of bodily functions which a wild animal possessed to a more secure, but poorer and far less happy, form of existence.

Having emphasized the importance of air and exercise, and dwelt upon the monotony of city life, Mr. Hill proceeded to consider the aids to health and efficiency. He said the widespread belief in the presence of organic poisons in the expired air was mainly based on the statements of Brown Sequard and D'Arsonval, which were wholly unsubstantiated by the most trustworthy workers in Europe and America. These statements had done very great mischief to the cause of hygiene, for they led ventilating engineers and the public to seek after chemical purity and neglect the attainment of adequate coolness and movement of the air. The efficiency of workers in mills, mines, tunnels, and stokeholds was vastly increased by the provision of a sufficient draught of cool and relatively dry air, so as to prevent the overtaxing of the heat-regulating mechanism. The electric fan had vastly improved the conditions of the worker in the tropics; and he would suggest that each clerk should have a fan just as much as a lamp on his desk. It would pay the employer to supply fans. All the efforts of the heating and ventilating engineer should be directed towards cooling the air in crowded places and cooling the bodies of the people by setting the air in motion by means of fans. The essentials required of any good system of ventilation were: (1) Movement, coolness, proper degree of relative moisture of the air; (2) reduction of the mass influence of pathogenic bacteria. The chemical purity of the air would be adequately ensured by attendance to the essentials.

LIGHTING ARRANGEMENT FOR PUBLIC LAMPS.

MM. Ch. & G. Grimmeisen, of Paris, have patented for France a device for the lighting of public lamps. It is simple in construction, easy to work, and not liable to get out of order by rough usage. It consists of a three-way cock placed on the gas-supply pipe, under the burner, so as to allow gas to pass simultaneously to the pilot-light and the burner or to the burner only. The plug of the cock is permanently drawn by a suitable device, such as a spring, towards the closed position. Keyed on to the plug is a handle which is acted upon by the trap-door of the lantern. To the handle is hinged a crutch, intended to keep the plug in the position corresponding with the flow of gas to the burner.

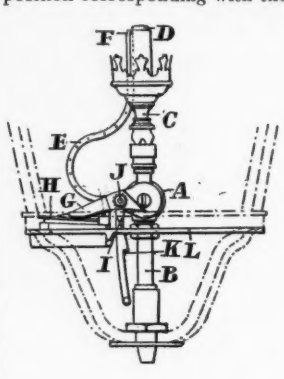


Fig. 1.

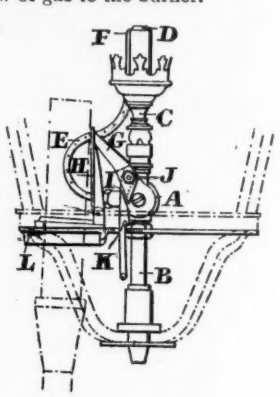


Fig. 2.

The arrangement is shown in the accompanying illustrations. Fig. 1 is a front view of a lantern with the igniting device in the position of rest; and fig. 2 a similar view, showing the trap raised by the lighting torch, which has turned on the tap.

The three-way cock A is mounted upon the gas-supply pipe B, upon which is a pipe C, going to the burner D, and also a branch-pipe E communicating with the pilot-light F. The cock is provided with a handle G, which, when the cock is closed, rests upon the trap H of the lantern. On the handle is a crutch I, turning on the pivot J. This crutch has at its lower part a catch K, which when the plug is open can rest upon the cross-piece L, supporting the burner and the lighting device.

When it is necessary to open the cock A, the trap, raised by the lamplighter's torch, pushes the handle G, and brings the plug into the position in which the gas simultaneously reaches the burner and the pilot-light. The torch then ignites the latter, which in turn lights the burner. Then the torch is withdrawn from the lantern, and the trap closes by its own weight. At the same time the plug turns back, but is checked by impact of the catch K against the cross-piece. When the burner has to be extinguished, all that is necessary is to move the end of the crutch to release it and allow the plug to return, under the action of its spring, to the completely closed position.

ITALIAN GAS SOCIETY.

The last number to hand of our contemporary, "Il Gaz," contains the programme of the forty-first annual meeting of the Italian Gas and Water Association, which will be held at Bologna from Thursday, the 26th inst., to the following Saturday.

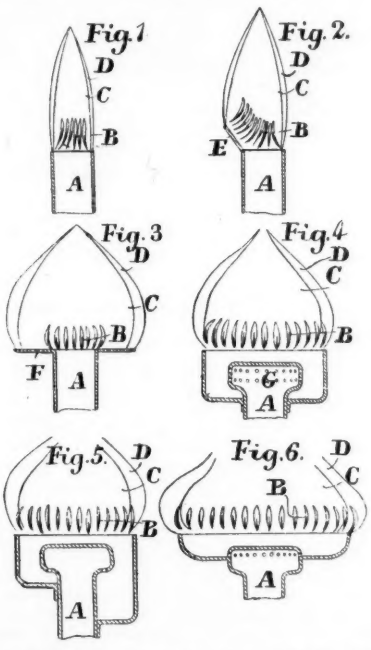
There will be the usual distribution of awards for the best papers read last year, and reports from the delegates to the international commissions on photometry and screw-threads. A discussion will be opened by Comm. Ing. Spreafico upon the advisability of removing certain onerous conditions from English coal contracts, and on tests on coal and other materials.

A list of seven papers to be read and discussed is given: "On the Use of Coke-Oven Gas at Trieste," by Comm. Ing. Sospinto. Sig. Luigi Butti will describe a new system of mechanical handling for medium-sized works. Dr. Ing. Dellacasa will deal with the treatment of the residual water from the Bueb process of gas purification; and Ing. Guilio Via will discuss the means employed to extend the use of gas and the organization of its propaganda. The mechanism of retort-ovens and their control and regulation will form the subject of a paper by Ing. Remo De Bartolomeis; while the new "Feld" process for the production of sulphate of ammonia will be expounded by Ing. Böhm and Sig. Pacchioni. There will be only one paper in the Water Section of the Association. It will be by Ing. Mario Vanni, on "The Purification of Water by Percolating Filtration."

The Municipal Gas-Works at Bologna will be visited on the first afternoon, and Ravenna is the town selected for an excursion on the Saturday. A full programme is thus outlined, and there is every promise of a more than usually interesting annual meeting.

AMPLIFYING GAS-BURNER FLAMES.

A patent has been taken out for France by Heer Jan Hendrik Windemuller for a device to produce a spreading-out or widening of a gas-flame by retarding contact of the mixture of air and gas with the supply of air to support combustion. This object is attained by surrounding the burner-tube, near the orifices through which the gas passes, with a screen, so formed as to prevent combustion inside; the coldest part of the flame being on the edge of the screen, which then conducts a minimum quantity of heat. The accompanying illustrations are all vertical sections of burners. Fig. 1 is the normal flame of an ordinary bunsen burner; fig. 2 is the same burner furnished with a partial screen on the side; fig. 3 is an ordinary burner with a horizontal circular screen adapted to the upper part; fig. 4, a bunsen "mushroom" with a ⊔-shaped screen on the side orifices; fig. 5, a similar burner with openings below; and fig. 6, another burner of the same kind with lateral openings. The first five figures relate more particularly to burners used for lighting; the sixth being for heating.



Referring to the figures, A is the burner, B the coldest part of the flame, C the part which has an average temperature, and D the part having a maximum temperature. In fig. 2, there is a partial screen E on the side of a bunsen burner; and in fig. 3, a horizontal circular screen F is fixed on the higher part of the burner. Fig. 4 shows a burner with lateral orifices G and a ⊔-shaped screen. The burner shown in fig. 5 has on the left a screen, of which the vertical section is relatively short, whereas the one on the right-hand side is much longer. In fig. 6, the screen is shallow, but wide.

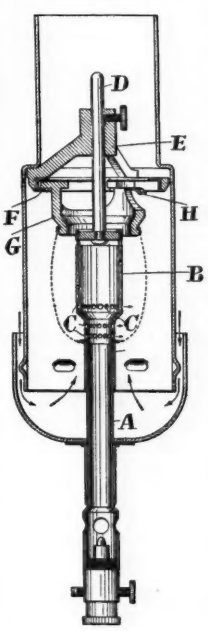
It has been found from experience that a similar flame to that represented in fig. 1 spreads laterally, as shown in fig. 2, and lengthens vertically, when a partial screen, such as is shown in fig. 5, is placed by the side of the burner. It has also been found that the spreading flame always takes the same form, whether the shape of the screen is as in fig. 3 or as in figs. 4 and 5. However, with the same consumption of gas, a flame spreading more than that shown in fig. 6 can be obtained when it is required to act on a larger surface, as in the case of certain heating appliances. The shapes of the screens in the diagrams are given as merely examples; and they can be varied in many ways according to the different objects in view.

The patentee states that experiments have demonstrated that, by means of the devices described, the saving of gas in heating water is about 25 per cent. in comparison with ordinary good burners; while with incandescent burners, the same consumption of gas gives additional luminous intensity to the extent of 50 to 65 per cent. compared with Welsbach burners. Various types of burners are known in which the ignition orifice is furnished with a ring, rim, or annular cap to give the flame an upward direction —*i.e.*, towards the mixing-chamber; or this rim is adjusted so as to be heated by the flame, and conduct heat to the gas-producing chambers to facilitate gasification. The screen forming the object of this invention has no analogy with these devices; the aim of the patentee being, as explained at the outset, to retard contact of the mixture of air and gas with the air required to support combustion, and to alter the initial point of combustion.

UPRIGHT BURNER WITH INVERTED MANTLE.

A device to prevent damage to the mantle when the mixing-tube of the burner is run from below through an opening made in the mantle has been patented for France by the Rudolf Langhans Company. When the mantle is put over the tube, the edges of the hole may easily come into contact with the sides of the tube and be damaged. The number of mantles required for such lamps is, consequently, relatively large. To avoid this, and enable the mantle to be fixed firmly, the mixing-tube is provided with a guiding device in order to prevent the edges touching the tube.

The arrangement is shown in the accompanying illustration. A is the mixing-tube, and B the upper dismountable part of it. The mixture of air and gas issues at C. On the upper part of the tube there is a rod D, upon which a perforated piece of cast iron E is fixed by means of the screw shown. On the lower ring-shaped portion of E there is an iron plate F, cut out in such a way that the ring G, holding the mantle, is secured by springs H.



The mantle is placed in position in the following way: The dismountable piece of the mixing-tube is taken off and inverted, as well as the rod D and the cast-iron piece E fixed upon it, so that B will be above and E below. Then the screw is loosened, after which B descends with the rod, and draws near enough to E to allow of the mantle being conveniently placed in position. It is impossible for the part B of the mixing-tube to damage the edges of the mantle, because it is nearly half-an-inch distant from these edges. By adjusting or carefully bringing the part B near to the hole in the mantle, by means of the rod D, it can soon be seen whether the hole in the mantle and B are concentric. When this is not the case, the mantle is centred with B by moving the annular holder G to one side. As soon as the hole is perfectly concentric with regard to B, this part of the burner is slipped through the hole, until the first row of openings C are on a level with the edge of the mantle, and then the part E is tightened with the screw, to keep B in this position. Then all the parts are again inverted, and the part B is passed over the lower part of the mixing-tube. The part E can be moved up and down the rod D, without making it rotate, to regulate the height of the mantle. Instead of being fixed by springs, the mantle-holder can be secured with screws, wedges, or in any other way.

Covering slow sand filters at Providence (R.I.) has effected a substantial reduction in the cost of cleaning. In 1907, before the covering was erected, the cost of cleaning the beds was $4·20 per million gallons of water filtered. The next year, with covered beds, the sand-cleaning expense per million gallons dropped to $2·03. In 1909, the cost was $2·05; in 1910, $1·78; and in 1911, $1·59.

PREVENTING ESCAPES OF GAS.

M. Picot's Safety Appliances.

At the Congress of the Société Technique du Gaz held in Marseilles last year, M. Picot called the attention of the members to various appliances he had devised for preventing escapes of gas through the detachment or fracture of the service-pipe, the temporary stoppage of the supply and its restoration after the extinction of the jets, or other causes. At the Congress held in Paris last June, he submitted other appliances having a like object, quite similar in appearance, but differing in their internal arrangements. Some of them are shown in the accompanying illustrations.

Fig. 1 represents the appliance first constructed; figs. 2 and 3, the improved form closed and open; and fig. 4, the form used for ordinary illuminating burners. Other examples of M. Picot's safety devices will be found in the "Register of Patents" in the "JOURNAL" for July 16 last.

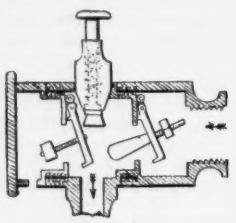


Fig. 1.

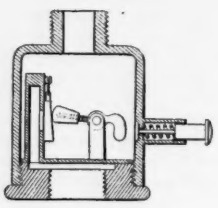


Fig. 4.

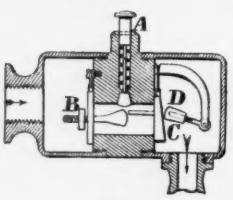


Fig. 2.

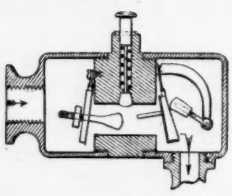


Fig. 3.

As at first designed for use with gas hot-plates, the appliance, to which M. Picot has given the name of "Block-Gas," consisted of two valves placed one before the other, as in fig. 1, with the gas-outlet between them. The one on the left opened to the atmosphere when the pressure of gas was not applied to it. It was found that, when the pressure was low, the valve did not close perfectly, and a slight escape of gas was the consequence. The arrangement was therefore altered as shown in fig. 2. It will be noticed that there are two compartments, connected respectively with the gas inlet and outlet pipes. The communication between them is regulated by a valve C, suspended from a curved arm. On one side the valve is furnished with a rod; and on the other side rests a movable counterweight D, which keeps it closed. In the left-hand compartment is a second valve B, which opens in the opposite direction to that of the flow of gas. This valve is so balanced as to open when the pressures before and behind it are about equal. In the centre of the device is a rod, which, on being moved downwards by the pusher A, acts upon the ends of the two rods on the valves. When gas is to be admitted, the knob of the pusher must be pressed. The valves will then be opened, and remain so as long as the flow of gas is normal. Should there be a leakage, the pressure falls, the valve B closes, and the supply of gas is cut off. On the flow of gas being stopped, the valve C, no longer kept open by the pressure, closes under the action of the counterweight D; but it can be opened again by pressing the pusher.

As in the arrangement shown in fig. 4 there is no risk of fractured supply-pipes, there is no valve opening against the current of gas. When lighting the burner, the pusher must be pressed to release the counterweight, and thus allow the valve to open.

OIL-MIXED CONCRETE AND ITS APPLICATIONS.

About a year ago, Mr. Logan Waller Page, the Director of the United States Office of Public Roads, made known the results of certain investigations he had been conducting into the properties of oil-mixed concrete as a waterproof material. The experimental work has since been progressing steadily, and the latest results are published in Bulletin No. 46 of the Office of Public Roads, which was issued early last month. The first part of the report deals principally with laboratory and service tests, the results of which are summarized in "Engineering Record" as follows.

The oils used were a fluid residual oil and a cut-back oil asphalt. The damp-proofing properties of concrete mixtures containing oil have been demonstrated very definitely by laboratory and by service tests which establish this material as one of great merit for certain types of concrete construction. It has also been shown that the admixture of oil is not detrimental to the tensile strength of mortar composed of one part of cement and three parts of sand, when the oil added does not exceed 10 per cent. of the weight of the cement used. The compressive strength of mortar and of concrete suffers slightly with the addition of oil, though when 10 per cent. of oil is added the decrease in strength is not serious. Concrete mixed with oil requires a period of time, about 50 per cent. longer, to set hard than does plain concrete; but the increase in strength is nearly as rapid in the oil-mixed material as in the plain concrete. Concrete and mortar containing oil admixtures are almost perfectly non-absorbent of water, and so they are excellent materials to use in damp-proof construction. Under pressure, oil-mixed mortar is very efficient in resisting the permeation of water. Laboratory tests show that oil-mixed concrete is just as tough and stiff as plain concrete, and furthermore its elastic behaviour within working limits of stress is identical with that of plain concrete. The bond or grip of oil concrete to steel reinforcement is much decreased when plain bars are used. Deformed bars, however, and wire mesh or expanded metal will reinforce this material with practically the same efficiency as in ordinary concrete.

For oil-mixed concrete, petroleum residuum oils conforming to the specifications given below have been found to give good results in both laboratory and service tests: (1) The oil shall have a specific gravity of not less than ·930 nor greater than ·940 at a temperature of 25° C. (2) It shall be soluble in carbon disulphide at air temperature to at least 99·9 per cent. (3) It shall contain not less than 1·5 nor more than 2·5 per cent. of bitumen insoluble in 86° Baumé paraffin naphtha. (4) It shall yield not less 2·5 nor more than 4 per cent. of residual coke. (5) When 240 c.c. of the material is heated in an Engler viscosimeter to 50° C., and maintained at this temperature for at least 6 minutes, the first 100 c.c. which flows out shall show a viscosity of not less than 40 nor more than 45 c.c. (6) When 20 grammes of the material are heated for five hours in a cylindrical tin dish 2½ inches in diameter by 1 inch high, at a constant temperature of 163° C., the loss in weight shall not exceed 2 per cent.

The following conclusions as to the effect of the oils used in cement and concrete may be drawn from the investigations into the physical properties of oil-mixed concrete: (1) The tensile strength of 1:3 oil-mixed mortar is very little different from that of plain mortar, and shows a substantial gain in strength at 28 days and 6 months over that at seven days. (2) The times of initial and final set are delayed by the addition of oil; 5 per cent. of oil increases the time of initial set by 50 per cent. and the time of final set by 47 per cent. (3) The crushing strength of mortar and concrete is decreased by the addition of oil to the mixture. Concrete with 10 per cent. of oil has 75 per cent. of the strength of plain concrete at 28 days. At the age of one year, the crushing strength of 1:3 mortar suffers but little with the addition of oil in amounts up to 10 per cent. (4) The toughness or resistance to impact is but slightly affected by the addition of oil in amounts up to about 10 per cent. (5) The stiffness of oil-mixed concrete appears to be but little different from that of plain concrete. (6) Results of tests for permanent deformation indicate that no definite law is followed by oil-mixed concrete. (7) Oil-mixed mortar and concrete containing 10 per cent. of oil have very little absorption, and under low pressures both are waterproof. (8) Oil-mixed mortar containing 10 per cent. of oil is absolutely water-tight under pressures as high as 40 lbs. per square inch. Tests indicate that oil-mixed mortar is effective as a waterproofing agent under low pressures when plastered on either side of porous concrete. (9) The bond tests show the inadvisability of using plain bar reinforcement with oil-concrete mixtures. The bond of deformed bars is not seriously weakened by the addition of oil in amounts up to 10 per cent.

Mr. Page discusses the proper uses of the oil-mixed concrete, and detailed instructions are given for specific cases. Following his report is an appendix devoted to the results of physical tests of oil-mixed concrete.

Water Sterilization at Erie (Pa.) is being carried on by means of the hypochlorite plant which was brought into operation in March, 1911. In a report lately issued, it is stated that the amount of available chlorine added to the water has varied from 0·25 to 0·35 part per million, equivalent to from 6 to 8 lbs. of the dry hypochlorite per million gallons of water. It has been found that, with the hypochlorite of lime averaging 36 per cent. of available chlorine, 7 lbs. of chemical per million gallons will sterilize the water in its worst condition. The average cost of operating the sterilization plant, together with the maintenance of the laboratory, was approximately $1 per million gallons of water treated during 1911.

New Pyrophoric Alloy.—The usual pyrophoric alloy employed for self-igniting match-boxes or gas-lighters consists of 70 per cent. of cerium and 30 per cent. of iron. According to "Brass World," a German inventor has found that alloys of manganese and antimony are also pyrophoric, and are cheaper than the cerium alloys. For certain purposes it is an improvement to add 10 per cent. of chromium; and during the melting of the alloy it is an advantage to add a very small quantity of aluminium or magnesium to increase the fluidity and soundness. The percentages found best are: Manganese, 80; antimony, 10; chromium, 10. Instead of giving a shower of sparks like the cerium alloys, it produces a long streak of flame—thus making the friction-wheel unnecessary.

REGISTER OF PATENTS.

Treating Carbonaceous Materials for the Production of Coal and Water Gas.

ROYSTON, E. R.; a communication from the General Reduction, Gas, and By-Products Company, of New York.

No. 15,964; July 10, 1911.

This invention of apparatus for the treatment of carbonaceous materials for the successive production of coal and water gas, has particular reference to the continuous desiccation and treatment of carbonaceous materials.

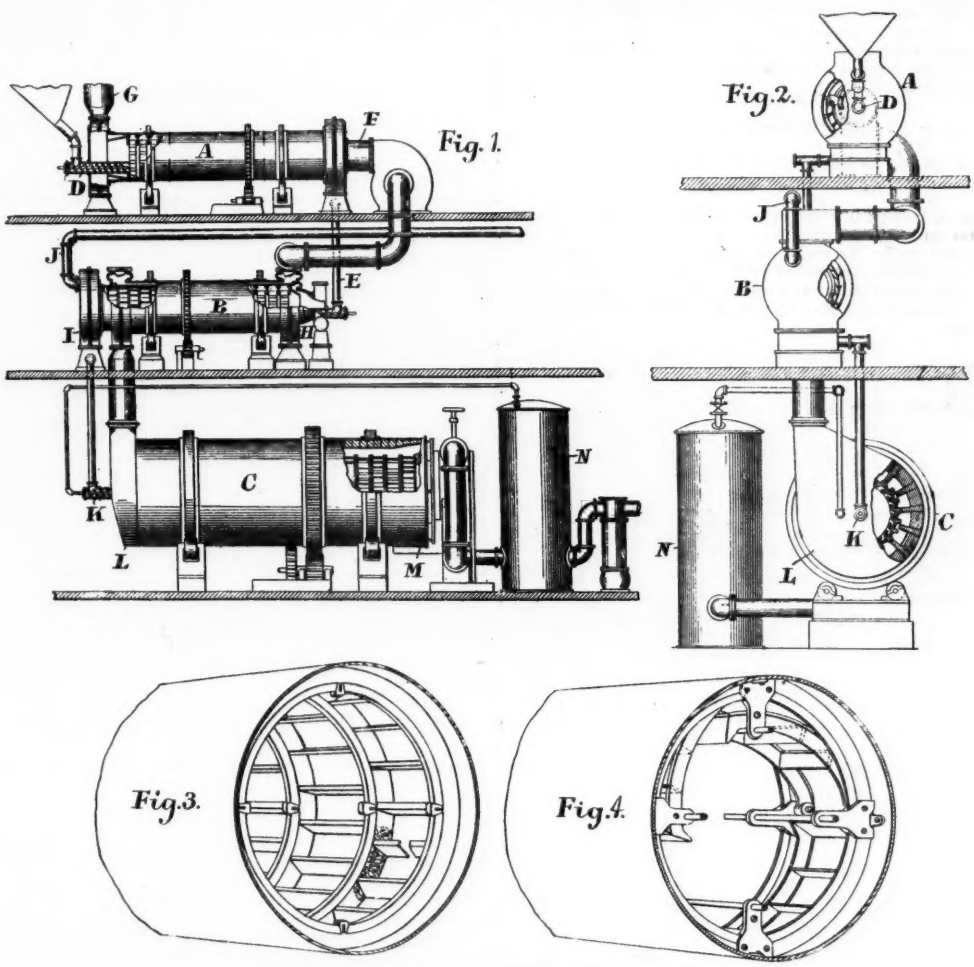
In previous proposals for the production of coal and water gas (the patentees point out), carbonaceous materials have been desiccated and coal gas distilled therefrom in rotary retorts, heated by combustion gases derived from stationary water-gas producers, intermittently operated and fed with the hot coke direct from the rotary retorts; and in connection with such proposals, it has been proposed to use blades in the coal-gas retorts for agitating and distributing the carbonaceous materials. Under this invention, the production of the coal and water gas is continuously carried on in continuously-operating apparatus—that is to say, the carbonaceous materials from which the water gas is produced are continuously agitated in externally heated rotary retorts, as well as the carbonaceous materials from which the coal gas is produced, and which pass into the water-gas producing retorts after the coal gas is distilled from it. The apparatus for carrying out this treatment comprises rotary vessels fitted with buckets or shelves for agitating and lifting the materials and effecting their rotation, and flexible plates or rings to enable a tight joint to be obtained between the rotary and stationary parts.

Fig. 1 is an elevation of apparatus for carrying out the invention. Fig. 2 is an end elevation on a larger scale. Figs. 3 and 4 are cross sections of part of fig. 1 (to a larger scale).

In the vessel A, a hopper leads the material into the intake or feeding device D. At the other (discharge) end of the vessel A is an offtake which leads into the discharge pipe E. F is the inlet-pipe for the drying and heating fluid—such as hot air or gas; and G is the outlet for the gas. In the vessel A are arranged at intervals ribs or check rings, and in each space between them are a series of distributing cups or buckets substantially parallel with the axis of revolution of the vessel. The vessel is preferably inclined from the feed to the discharge end; and the buckets "may be staggered in alternate sections to assist in securing an evenly distributed showering action, and so shaped that they will pick up the material to be treated, and they will allow it to fall out in a uniformly distributed shower across the inside diameter of the cylinder as it rotates."

When working, the material is introduced into the vessel A, where it is dried and partially heated. As the vessel is preferably slightly inclined toward the discharge end, the material is advanced by the rotation of the cylinder, and is discharged through the discharge pipe E into the intake of the vessel B. The drying medium (hot air or gas) is supplied through the pipe F, and carries with it in its discharge from the vessel A through the outlet G any moisture it is desired to remove from the material. The rotation of the vessel A, and the operation of the buckets or cradles in it, "causes the material to be showered again and again through the hot air or gas and permits a thorough drying of the material, while the ribs prevent its too rapid passage through the vessel."

The material passes into the vessel B through the intake in a heated condition; and as the vessel may be inclined from the feed end H toward the discharge end I, the material is advanced by the rotation of the vessel, and is kept in a broken-up and finely-divided state by the revolution of the vessel, and by the lifting effect of buckets or cradles in it. The vessel is heated by gases passing through circumferentially arranged



An American Process for the Continuous Production of Gas.

flues; and as the material is repeatedly impinged upon the internal periphery of the cylinder, it is "quickly brought to a temperature at which gasification takes place." The gas as produced, together with any bye-products released from the material, passes out through the pipe J, by which it is led away for further treatment. The residue of the material in the form of coke passes out through the off-take and discharge pipe into the intake K of the vessel C.

As this vessel may be inclined from the feed end L to the discharge end M, the rotation of the cylinder advances the material toward the discharge end, and it is continually and repeatedly showered down upon the heated side walls of the vessel. The impingement upon the heated surface is facilitated by the buckets with which the vessel is fitted, and the temperature of the material is raised quickly to "the desired point, which, in treating carbonaceous materials for the production of water gas, is over 1600° Fahr." The water gas produced is drawn off through the boiler N to a suitable receptacle. Where it is desired to enrich the water gas to give it illuminating power, fluid hydrocarbon or other enriching material is introduced into the vessel with the coke, with the steam, or separately.

The material—whether coal or other carbonaceous material, such as wood, sawdust, peat, lignite, bagasse, or the like—moves in one direction through the successive rotating vessels, while the heating gases move in the opposite direction. In this manner the heat is utilized to the best advantage, because the final operation in the apparatus requires the maximum intensity of heat, and the preceding operations utilize the heat of the heating gases in the diminishing degrees of intensity required, "until the heating gases are finally rejected at a temperature so low as to insure the most economical results in operation."

Contrariwise, it is pointed out that the temperatures also increase gradually from the material entrance to the material exit ends of the separate vessels, as well as the average temperatures of the successive vessels, "which average temperatures (or rather the range of temperature in each vessel) are adjusted so as to produce the most efficient results in view of the temperature requirements of each particular stage of the complete method and apparatus."

Thus the material, with which best results can be had when it is kept constantly in motion, and when it is maintained in a finely subdivided form, is subjected to the action of constantly increasing degrees of temperature as it advances through the entire system, thereby removing the volatile constituents of the material in proportion to their volatility; and in this manner the volatile hydrocarbons and other compounds are not decomposed into their constituent elements, as would be the case were they overheated, and the yield of bye-products is thereby increased without producing quantities of heavy tar and pitch. The efficiency of the apparatus is said to be increased by the repeated dropping of the particles due to the rotation of the vessels or the rubbing of the particles against each other. "This action causes the decomposed surfaces which have formed on the outside of the lumps or particles to be broken or rubbed off, thus leaving new surfaces to be exposed to the action of the treating medium."

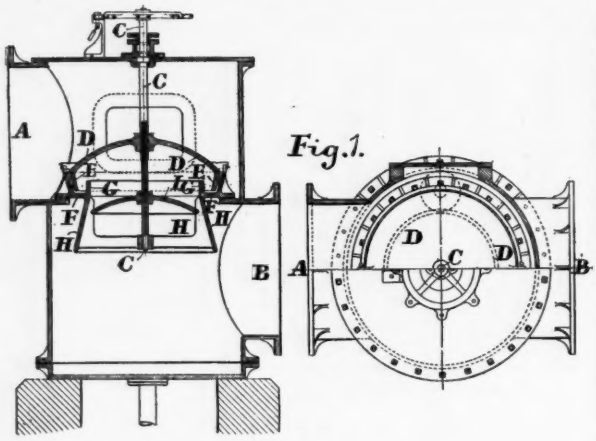
The theoretical gasification temperature for coal gas, it is pointed out, is approximately 752° Fahr.; while the temperature of disassociation of ammonia is 932°. The average yield of ammonia now obtained in coal-gas making is 14 to 15 per cent. of the theoretical amount; and this loss is occasioned by carrying out the process of gasification at a temperature exceeding 932° Fahr.—a condition essential to the operation of a coal-gas plant operating by present methods. By this improved method and apparatus, the patentees claim that they are enabled to effect complete gasification to the extent of distilling nearly all the volatile matter contained in the coal at a temperature below 932°, thus recovering more nearly the theoretical yield of ammonia. The volatile matter remaining in the coal will be liberated in the form of a fixed gas when treated in the vessel C at higher temperatures, where it serves to partially carburet the water gas formed therein. In this manner they are enabled to treat carbonaceous materials at lower temperatures than are now commercially possible, thus preventing the loss of valuable products by overheating.

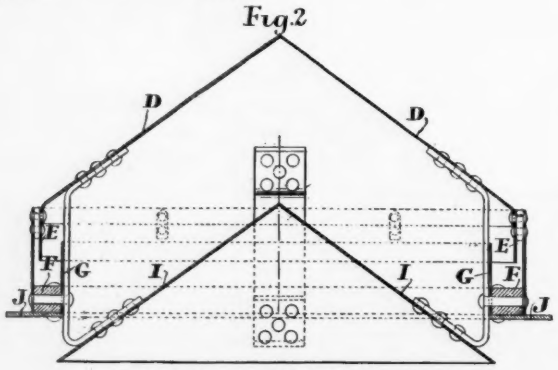
Separating Liquid Impurities from Gases.

CARTER, S., of the Garston Gas-Works, Liverpool.

No. 20,757; Sept. 20, 1911.

This invention is more particularly applicable to the separation and removal of tar from carburetted water gas, coal gas, producer gas, and the like; and, broadly, it consists in placing within the gas-main proper, or in a bye-pass main provided for the purpose, an arrangement whereby the liquid impurities are precipitated on to the upper face of a lower cone, whence they fall—suitable arrangements being made for their discharge.





Carter's Separator of Liquids from Gases.

Fig. 1 represents in longitudinal section and plan (partly in section) the mode of embodying the invention when applied to a horizontally-disposed main. Fig. 2 illustrates, in longitudinal section, a construction suitable for application to a vertical main.

The arrangement is fixed in connection with the gas-main proper, or in a bye-pass main provided for the purpose; gas entering at A and leaving at B. Secured to a vertical spindle C is an "imperforate gas obstructing element" D, preferably in the form of a bell, cone, or truncated cone—the top or apex of which is presented to the current of gas passing through the main. Integral with the lower portion of the cone is an annular depending ring or flange E. Arranged on the outside of the cone or flange is an annular ring or hoop, and at the lower end (at right angles) is a plate ring F, the inner diameter of which is less than the cone or flange. At the inner periphery of F is an annular wall G, which extends upwardly beyond the edge of E, which latter does not meet the plate ring F. Arranged below F is a short pipe or conduit H, within which is a second gas obstructing cone I, also supported by the spindle C.

In use, the unpurified gas passing through the casing is obstructed by the upper imperforate cone D, and is compelled to pass through the annular space between the depending cone ring or flange E and its outer annular hoop, "being thereby wire-drawn, so that the tar particles in suspension are agglomerated" The gas flow is then obstructed by the plate ring F, and the gas is deflected upwards, passing through the annular space between the wall G and the depending cone or flange E. On meeting the lower (concave) face of the upper cone D the gas is deflected downwardly again, and passes into the main via the annular space between the outer periphery of the lower cone I and the inner wall of the conduit H. The liquid impurities are thus precipitated on to the upper face of the lower cone, whence they fall into the lower part of the casing and are drained off at intervals.

The appliance is able to be regulated in acordance with the volume of gas passing through the main in a given time. This is effected by moving the cones simultaneously towards or away from each other, so that the trap openings are reduced or enlarged as the case may be.

In fig. 2, the upper cone depending ring E is secured to an annular ring or hoop maintained concentric with it by distance-pieces; the hoop being adapted to make an easy fit within the main. The lower cone I, which preferably extends upwardly beyond the top of the inner annular wall G, is supported from the upper cone D by brackets placed at intervals with ends riveted to the cones—the whole being rigidly attached to a light flange J adapted to be held (say) in a joint in the main.

Generating Gas.

JORDY, F., and HARTING, C., of Berlin.

No. 19,960; Sept. 7, 1911.

The method of generating gas according to this invention consists in subjecting glycerine or sugar (or a mixture of glycerine and sugar or other carbohydrate) to the action of an oxidizing medium—preferably permanganate of potash—in the presence of water; and, according to one modification of it, the patentees prefer, especially when there is no carbohydrate, to make an addition of a hydrocarbon liquid (like vaseline-oil) to the mixture to be treated with the oxidizing medium.

In carrying their invention into practice, they proceed as follows: 200 parts by weight of permanganate of potash, either in solution by water, or dry, are mixed with 100 parts of vaseline-oil; and as gas is required glycerine is added a little at a time until the full quantity of 20 parts of glycerine have been added. If the permanganate of potash was mixed in the dry state, a considerable quantity of water must be mixed with the glycerine; but if the permanganate has been previously dissolved in water, no water is required to be added with the glycerine. The mixture is made in a cold state in a vessel having a discharge for the escape of the gas, "which is generated forthwith, but not rapidly enough to create any danger of explosion."

The quantities of the ingredient given above will produce about 50 litres of gas, the constituents of which will be carbon monoxide, carbon dioxide, hydrogen, a small quantity of methane, and some hydrocarbon vapours; and the product has been found to develop approximately 5200 units of heat. Atmospheric air or oxygen is admitted, for combustion, at or close to the point of combustion; and if an amount of approximately 40 per cent. of air is added to gas of the composition before specified, "a blue flame of extraordinary heat will be obtained, such as is produced by bunsen burners for incandescent mantles."

Discharging Vertical Gas-Retorts.

ROBERT DEMPSTER AND SONS, LIMITED, AND TOOGOOD, H. J., of Elland.

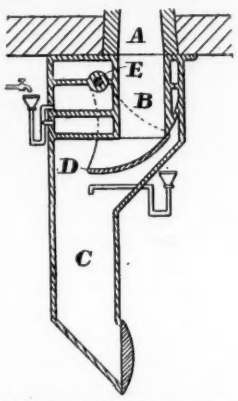
No. 11,210; July 22, 1911.

This invention relating to continuous or semi-continuous vertical retorts has for its principal object "to facilitate the discharge of the coke without breakage thereof."

The patentees point out that the lower end of the retort being more or less oval in cross section, and this shape presenting difficulties in the mechanical extraction of the coke, in continuous retorts an extension has previously been added having sloping sides, in order to enable a circular or like cross section to be obtained where the extracting mechanism was applied without having to support the whole downward thrust due to the weight of the charge. These stationary inclines, however, compressed the coke, and tended to produce hanging-up or "bridging" of the coke—necessitating poking and breakage of it. To obviate these difficulties, the inventors propose to arrange a reciprocating inclined, horizontal, or curved tray in such a position as to receive the coke from the oval cross sectional portion of the retort. In the case of a curved tray, its movement gives a slight upward thrust, which assists in preventing "bridging;" and the reciprocation of the tray causes the coke to be gradually discharged in small quantities. Thus to a large extent the necessity for poking is obviated; and the coke is discharged in larger pieces than was hitherto the case. The series of trays in a number of retorts may be secured to a shaft running along the bench, to which shaft reciprocatory rotary movement is imparted by any suitable means; while a safety device may be provided in connection with the shaft, to prevent damage in the event of the coke accumulating below the tray not being discharged in due time.

The diagram represents the bottom of a retort and its appurtenances.

A is the retort, and B a downward extension of it having parallel or outwardly sloping sides surrounded by water-chambers or air-flues. C is the discharging mouthpiece, having any desired capacity and being closed by an ordinary self-sealing lid. The reciprocating tray D works on a shaft E, the bearing of which may be formed in the horizontal partition between two of the chambers named above and is thereby



Dempster and Toogood's Discharge for Vertical Retorts.

kept cool. The general principle of a reciprocating tray is well known, the patentees point out, for other purposes in gas plant, such as hopper and conveying plants. Discharging means consisting of a table swept by reciprocating scrapers are also well known, and are not included in the scope of this invention—such scrapers tending to break up the coke, which it is desired to avoid.

Vertical Gas-Retorts of the Continuous Type.

ROBERT DEMPSTER AND SONS, LIMITED, and TOOGOOD, H. J., of Elland.

No. 16,471; July 22, 1911.

This invention has for its object to facilitate the discharge of the coke from vertical gas-retorts of the continuous type without breakage. The taper of the retorts is made sharper in the upper than in the lower portion, in order to provide for the expansion of the coal when first heated, and to facilitate the uniform downward progress of it. For example, in a retort 25 feet high the cross sectional diameters may be 48 inches by 10 inches at the top, 54¼ inches by 14¾ inches half way down, and 60 inches by 19 inches at the bottom.

The patentees say they are aware that in vertical retorts which are not of the type wherein there is continuous feeding and a continuous removal of coke, a variable taper has been proposed, as in patent No. 2487 of 1872; but this was with the object of driving the vapours down, whereas the object of using continuously working retorts is the reverse—that is, to enable the gas to leave easily at the top, as continuous feeding and continuous removal of coke preserve always a thin cap instead of a thick cap of uncarbonized coal at the top of the retort. They are also aware that in patent No. 19,196 of 1909 apparatus is described in which the sides of the retort proper are of uniform taper; but a superheater of less diameter is placed above the retort, and the sides of the retort are bent inwards at the top to meet the edges of the slot which forms the entrance to the superheater. But this detail of construction has no relation to the purposes of the present invention; and the patentees "desire to make good coke by reducing skin-friction to the minimum, so that the weight of the superimposed portion of the charge acting downwards improves the grade of coke by assisting in the formation of larger pieces." As, however, the necessity for economy of fuel will not permit of much increase in the minor axis of the retort, they alter the shape of the retort for this purpose.

Continuously working retorts have, they conclude their specification by stating, usually been of uniform taper from top to bottom. The object of the taper is to overcome the friction between the charge and the retort. They have found that the friction is greatest at the narrow top of the retort, and least at the wide bottom, and is greater at the corners than at the sides. Accordingly they utilized the available taper "in an improved manner by disposing it as much as possible in the upper portion of the retort. Preferably more taper is given to the major axis than to the minor axis of the varying cross sections; thereby freeing the material from the corners."

Hydraulic Mains for Gas-Retorts.

SHILTON, W. A., of Coventry.

No. 22,308; Oct. 10, 1911. No. 6750; March 19, 1912.

This combined invention relates (in the words of the patentee) "to the kind of apparatus for the hydraulic mains of gas-retorts which consists of a series of open-topped pipes, or a divided trough, surrounding the bottom ends of the dip-pipes so as to isolate the seal ends of the same and reduce the fluctuations in such mains."

Hitherto such anti-fluctuator means, he points out (when of the type which enables the gas to freely escape from the ends of the dip-pipes), have been adjustable vertically only from the interior of the main, so that the depth of the seal could not be altered during the working of the apparatus. It has also been proposed to damp the fluctuations of the liquid in the hydraulic main by baffle-plates, which cover the liquid surface in the main except for the spaces through which the gases find exit—such baffle-plates being adjustable in level from the exterior of the main by bolts passing through stuffing-boxes.

Anti-fluctuator means according to the present invention comprise a series of open-topped pipes, or a divided trough, surrounding the bottom end of the dip-pipes so as to isolate the seal-end of each dip-pipe and at the same time allow the gas to escape with a minimum of resistance—the pipes or trough having bottom openings for the outlet of tar and the circulation of liquid, in combination with means for vertically adjusting the anti-fluctuator means from the exterior of the hydraulic main. When a hydraulic main is so fitted, it is claimed that there will be no fluctuations in the water-level, and absolutely no wash on the bulk of the water. Moreover, there will be a perfectly steady water-guage on the retorts, and it will be possible, without danger, to work with a lighter seal of the dip-pipes in the hydraulic main than is usual. "Moreover, there will be an entire absence of stopped ascension pipes and the strength of the liquor in the hydraulic main will be increased."

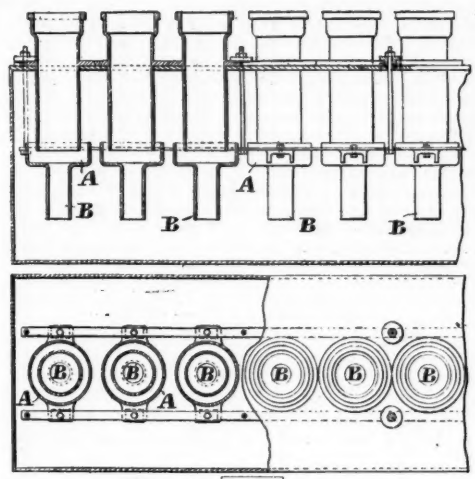
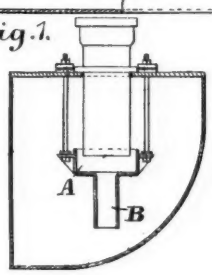


Fig. 1.



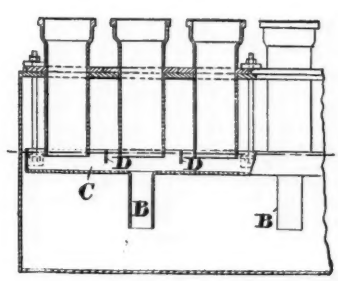
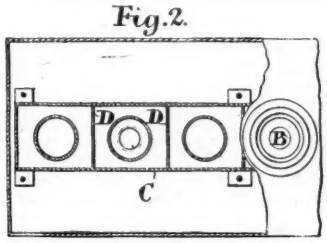


Fig. 2.



Shilton's Hydraulic Main.

Fig. 1 is a part sectional elevation plan, and end elevation of a hydraulic main and dip-pipes with the invention applied to it. Fig. 2 is a part sectional elevation and plan of a hydraulic main and dip-pipes with a modification of the invention applied to it.

In the hydraulic main there is provided for each dip-pipe a bell-mouthed or open-topped pipe A (the "anti-fluctuator pipe") which surrounds the bottom of, and is of considerably larger diameter than, the dip-pipe. These anti-fluctuator pipes are supported for vertical adjustment from outside the main by (say) being fixed to two horizontal bars (one at each side of the row of dip-pipes) suspended by bolts passing through holes in the top of the main. Nuts on these bolts enable the height of the anti-fluctuator pipe to be adjusted as may be required to suit the working seal of the dip-pipes. The anti-fluctuator pipes project a short distance above the water-level, and each pipe is by preference made with an inclined or flat internal flange slightly below the bottom of the dip-pipe. At the termination of this flange the anti-fluctuator pipe is reduced in diameter as shown at B, and carried down to a convenient distance above the bottom of the hydraulic main—the

bottom ends of the anti-fluctuator pipes being open to admit water and allow of the escape of liquor and tar into the hydraulic main.

In the modification shown in fig. 2, one anti-fluctuator pipe serves for several dip-pipes, by making the upper portion C of the anti-fluctuator pipe of long trough shape (adapted to receive two or more of the dip-pipes) and furnished with one or more of the downwardly projecting outlet pipes B for the tar and liquor and the circulation of the latter. The trough is made with a cross partition D between every two dip-pipes, so as to prevent movements of the water round the bottom of one dip-pipe from affecting that round the other. These partitions project upwardly above the water-level to the top of the trough, but do not extend to the bottom of the trough; and thus they do not prevent the circulation of the liquor along them underneath the partitions.

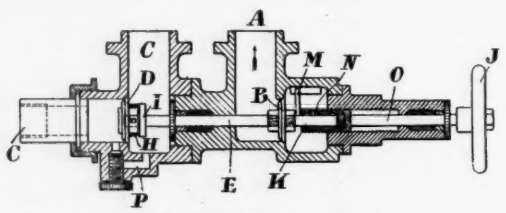
The anti-fluctuator pipes (or the compartments thereof formed by the cross bars D) thus form a separate seal for the corresponding dip-pipe, so that any movements in the water in any anti-fluctuator pipe or compartment will be localized, and will not be transmitted to the remainder of the water in the hydraulic main. As the gas gently bubbles up through the water contained in the upper portion of the anti-fluctuator pipe, it causes some of the water to be splashed over the upper rim of the anti-fluctuator pipe, and other water from the hydraulic main rises up through the narrow parts B of the anti-fluctuator pipes and "thus adjusts the water-level and maintains a perfect seal and causes the complete circulation of the whole of the water in the hydraulic main, which ensures an even temperature thereto." Moreover, by the invention it is said that "the continual circulation of the water causes a greater absorption of ammonia from the incoming gas, and thus increases the strength of the liquor contained in the hydraulic main."

Controlling Gas-Valves.

BERRY, J., and GLOVER, W. T., of Oldham, and METERS LIMITED, of Manchester.

No. 22,183; Oct. 9, 1911.

This invention relates particularly to combined inlet and outlet valve fittings of the type allowing of the meter being placed under the full inlet pressure before any flow whatever through the outlet can take place.



Berry and Glover's Gas-Controlling Valve.

The valve casing is formed with an inlet A to the meter (controlled by a valve B) and an outlet C from the meter, controlled by a valve D—the two valves being secured upon a common stem or spindle E. A stuffing-box, through which the spindle passes, is provided in the partition between the inlet and the outlet. The inlet valve is attached to the valve-actuating spindle, while the outlet valve is operated from the latter by a pin and slot or some such arrangement, which allows of a certain amount of free movement of the spindle relatively to the valve before the latter is operated upon to open it. A spring H, interposed between the outlet valve and a collar or projection I upon the valve stem, ensures that the outlet valve shall remain upon its seat until the spindle has completed its predetermined amount of free movement, in which period the inlet valve is wholly or partially opened. The further movement of the valve stem then moves the inlet and outlet valves simultaneously.

The valves proper may be of any suitable shape. For example, they may be of hemispherical, sectoral, or other curved or rounded form, or may be ordinary mitre valves. In the arrangement shown, the valves B and D are themselves so shaped as to give a very gradual increase in the valve opening for each turn of the spindle O.

If desired, a bye-pass or release passage P (with a thumb-screw or control fitting on it) is provided between the meter interior and the outlet passage beyond the outlet valve as has been previously proposed; the bye-pass serving for the purpose of relieving (when desired) the pressure within the meter when the inlet valve is closed.

Sunbury Public Lighting.—At the last meeting of the Sunbury District Council, the Gas Committee submitted a report containing a recommendation to the effect that it should be suggested to the Sunbury Gas Company that there should be a new contract for street lighting containing the following amendments: That the contract should be for six months from Sept. 30, 1912; that the use of No. 4 governors should be allowed, subject to a deduction of 2s. 6d. per lamp per annum; that the Company should be allowed to alter the 3½ feet governors to No. 4, providing the same are all stamped by the maker as No. 4 and passed by the Surveyor to the Council; that the Company should forthwith remove the governors by request of the Council if the contract were not extended beyond the six months; or, in the event of an extension, on receiving one month's notice to remove them. Mr. Sutherland, in moving the adoption of the report, said there was one thing that might be further amended in accordance with a letter received from the Company, who accepted the new conditions with the exception of the six months' clause. He thought it better to agree to the terms as now put before them. The Committee had done their best to obtain the most efficient service of street lighting in the district. The report was adopted, with the exception of the clause mentioned.

MISCELLANEOUS NEWS.

REGULATION OF AUSTRALIAN GAS COMPANIES.

Proposed Drastic Measure for Sydney.

In the report of the proceedings at the annual general meeting of the Australian Gaslight Company which appeared in the "JOURNAL" a fortnight ago (p. 629), it was mentioned that the progress of a Bill which the Company had presented to the State Legislature had been impeded in a most unaccountable manner, and that, in consequence, many extensions which should have been completed had been stopped. It may be remembered that the Chairman (Mr. G. J. Cohen) said he could not understand the action of Parliament in delaying the passing of the Bill. The explanation is afforded by some extracts from the "Sydney Daily Telegraph" which reached us yesterday. It appears that the Government have framed a General Bill for the regulation of gas companies, some of the provisions of which are of a most drastic character. It was introduced and read a first time on the 8th ult., rather more than a week after the meeting above referred to; and its revolutionary character may be judged from the following epitome.

At the outset it is specified that the words "gas company" shall mean, unless the context otherwise provides, any company, corporation, firm, or person supplying gas for lighting, heating, motive power, or other purpose, and disposing of the same for profit, but does not include a local authority. Municipal gas-works are consequently exempt from its provisions.

Clauses 4 to 6 concern the testing of gas, and prescribe the penalties to be inflicted on gas companies who supply it of less illuminating power than that specified. Adequate pressure is similarly provided for by clauses 7 to 9. From sunset to midnight the pressure must be maintained at not less than a specified amount; while from midnight to sunset it shall be not less than six-tenths of that required for the other portion of the 24 hours. Gas examiners (for whose appointment the Bill makes provision in clauses sections 10 to 12) may test the pressure at any testing-place or public lamp, and shall be afforded by the companies all reasonable facilities for so doing. Failure to maintain the required pressure will involve the company in liability to a penalty not exceeding £10, but not more than one fine may be imposed for breaches of the Act committed within a period of 24 hours. Circumstances beyond the control of the company, otherwise than lack of funds, are to be regarded as a sufficient excuse for breaches of the Act. The penalty for supplying gas deficient in illuminating power is £2 for the first half-candle of defective power, and not less than £25 nor more than £100 for the first and every subsequent candle. Standard gas must give, when burnt at the rate of 5 cubic feet per hour, a light equal to that produced by 16 sperm candles of six to the pound.

Clause 13 refers to dividend, and is in the following terms:

> Except as by this Act provided, the profits of any gas company to be divided among the holders of its share capital or stock in any year shall not exceed the following rate (which is in this Act referred to as the standard rate of dividend)—that is to say, on the capital of the company at the rate of four pounds in respect of every one hundred pounds actually paid up of such capital: Provided that where any gas company which at the commencement of this Act is carrying on the business of supplying gas has during any of the three years next preceding such commencement paid to the holders of its share capital or stock as a dividend at a higher rate than the standard rate as above prescribed, the Minister shall certify the mean rate of dividend so paid during such years or ten per centum whichever shall be the less; and thereupon the standard rate of dividend with respect to such company shall for the first year after such commencement be the mean between the rate of four per centum as above prescribed and the rate so certified by the Minister, and for the two subsequent years the mean between the standard rate for the preceding year and four per centum, after which the standard rate shall be four per centum per annum.

The succeeding clauses relate to the formation of a special purposes and a reserve fund, neither of which is to exceed 10 per cent. of the capital. Clause 17, referring to the divisible profits, is as follows:

> If the clear profits of the company in any year amount to a larger sum than is sufficient to pay the authorized dividend on the share capital of the company, the excess shall be placed to the credit of an account to be called the "divisible profits account;" and not more than 20 per centum of the amount placed to the credit of such account in any year may be retained and carried forward to the credit of the divisible profits account of the following year, and the remainder, being not less than 80 per centum, shall be applied to the reduction of the price of gas and the payment of a dividend as provided in section 19.

A penalty of £100, *plus* £50 a day, is incurred if the foregoing provisions are infringed.

The clause just referred to provides for a sliding-scale of price and dividend. A schedule to the Bill fixes the standard prices as 3s. 9d. per 1000 cubic feet in the cases of the Australian and North Shore Gas Companies, and 3s. 7½d. in the case of the Newcastle Gas Company—these being the present rates. If the price of gas is reduced below the standard, the dividend may be increased by 5s. per cent. for each 1d. reduction.

Additional shares may be issued, provided they are offered for sale by public auction or tender, of which proper notice has been given. The method and conditions of sale are prescribed. Whatever portion of the price obtained exceeds the reserve price fixed by the directors (of which prior notification must be given under seal to the Minister) is to be placed to the special purposes fund, and is in all cases to be treated as non-dividend bearing.

The keeping and auditing of the accounts are dealt with in clauses 21 and 22, which provide for the making of regulations in this respect:

> The Auditor-General, at the request of the Minister, shall, and the Minister may on his own initiative or at the request of not less than twelve users of the gas of any gas company, cause the Auditor-General to examine and audit, or cause any officer of the public service appointed by him to examine and audit, the accounts of such company.

It is provided that the Government may take possession, temporarily, of the land and premises of a gas company who have ceased to supply or have suspended the supply of gas, and appoint a manager to carry on the business, such manager having the powers of the company and its directors and manager. When he thinks fit, the Governor has power to remove the manager and restore the business to the company.

Press Comments on the Bill.

Under the heading "Regulating Gas Companies Out of Existence," the "Sydney Daily Telegraph" commented as follows on the Government Bill.

It was with stupefaction that the summary of the Bill to regulate the gas companies was read in our columns. It appeared incredible that the State could propose what would be virtually ruination to some thousands of shareholders who, on the faith of Acts of Parliament, had invested their savings in these undertakings, had taken all the risks, and because they had been successful had incurred the enmity of the party which now dominates this State. We have maintained that the proper regulation of the gas companies is a duty which every State has the right to provide for. In a sense, these companies are monopolies, even if electricity, kerosene, and other illuminants are available to the public. But regulation is not, and should never be regarded as synonymous with, confiscation; and if this measure were to pass into law, it would be confiscation pure and simple, and, moreover, would effect a complete paralysis of all efforts on the part of these undertakings to keep pace with the constantly growing needs of the towns they serve. It appears fabulous that a rate of dividend should be standardized which would place the entire list of our gas companies at a serious discount—a rate at which the Government itself finds it growingly difficult to borrow, and at which even the city of Sydney can no longer raise money, though it has the security of the entire body of ratepayers behind it. The aim could only be to render the adequate supply of gas by public companies an impossibility; and consequently we find the Government taking powers to step in and conduct the business on its own account, appointing managers with full control over the entire property. What is more, all these provisions are reserved for public companies—not for municipalities which carry on their own lighting. They will be able to supply inferior gas, and misconduct their operations free of all supervision; whereas in England the corporation gasworks are as much under control and must declare their working costs and accounts as fully as the companies are compelled to do.

There are in New South Wales some seventeen gas companies with more than £1,400,000 of paid-up capital, and admittedly they have proved hitherto very profitable investments. The aggregate market value of their share capital has recently been about £3,500,000, or about 150 per cent. premium; and, in addition, they have issued about £400,000 worth of debentures, and have accumulated well over £600,000 of reserves and premiums on new issues, which have mostly been invested in their business. Thus, though their share capital is only £1,400,000, their investment is in reality quite £1,000,000 greater. Probably it is much more so, as large amounts have been appropriated out of profits towards extensions of the systems. They have, like other undertakings, built up their properties, which represent far larger sums than their capital indicates. The Australian Gaslight Company is much the oldest and greatest of these companies—it is, in fact, the oldest gas undertaking in the Southern Hemisphere; and though it missed some dividends at the outset, it has paid 15 per cent. for a great number of years. Probably it has sunk double or treble its nominal capital in the undertakings it has ably conducted. There are none of the original shareholders left, nor have there been for many years; and the entire 1300 shareholders have invested on the basis of the dividends they have been paid, which meant about 200 per cent. premium. Nor has the Government failed to collect its tolls on this premium, both in income-tax and death duties. Now, the effect of the measure before Parliament would be to reduce the value of the property to the shareholders by about £1,750,000, and those who are depending upon their dividends would be most grievously injured. The compulsory reduction of the dividends from 15 down to 4 per cent. is simply beyond belief; and the Government which could perpetuate such an act of spoliation would justly merit all the discredit which such indefensible action would entail. If such can be done with one set of companies, it can be done with others; and if 4 per cent. is to be the highest rate a New South Wales company can be permitted to pay, we shall have a wholesale stampede of capital. It may be said that by reducing the price of gas the companies may pay higher dividends. But under the proposed sliding-scale the Australian Gaslight Company would have to reduce the price of gas to 1d. per 1000 cubic feet to enable it to pay its time-honoured dividend. This has only to be stated to show its utter impossibility.

The position is this: Had such a proposition as the Government now makes been put forward when these gas companies were established, not one of them would ever have been formed. They were formed upon an entirely different basis; and while we may regulate them as to their accounts, as to the quality of the gas they supply, and penalize them if they fail in their service, confiscation would be entirely indefensible, and dishonest. Control or purchase need involve no such catastrophe. That the companies should, in the interests of the community, be bought out at a fair figure, would be an honest proposition. But this measure, as outlined, would be barefaced confiscation. It is to be hoped, however, that, if there is to be legislation, it will be framed upon the lines of the English Acts, which it was said were to be followed, but which have most emphatically not been followed in the outline of the Bill as published.

JOINT-STOCK COMPANIES' RETURN.

The Twenty-First General Annual Report by the Board of Trade on matters within the Companies (Consolidation) Act, 1908, contains a list of the Companies which were dissolved or struck off the register during the year ending Dec. 31, 1911, and this includes the following names.

Aberdare Electric Lighting Company, Air-Light Company, Anti-Vibration Incandescent Lighting Company, Arnside Gas Company, Ashford and District Electric Supply Company, Birmingham Intensified Gaslight Syndicate, British Arc Lamps, British Lighting Development Company, Brockie-Pell Arc Lamp, Buenos Ayres Electric Light Company, Buenos Ayres (New) Gas Company, Camberley Electric Supply Company, Cartagena (Spain) District Water Supply Company, Castle Donington Gas and Coke Company, Chichester and District Electric Supply Company, Combined Incandescent Mantles Syndicate, Criccieth Water-Works Company, Doty Lighting and Heating Corporation, Dura Incandescent Mantle Company, Egremont Gaslight and Coke Company, Farnham and District Electric Light Company, Formby and Freshfield Electric Light Company, Garonne Valley Electric Supply Company, Gas Traction Company, General Heating and Lighting Company, Harwich Electric Lighting and Tramways Company, Holt Gas Company, Howelite, Indiana Oil and Gas Company, Korean Water-Works, Light and Heat Company, Lustre Lamp Light Syndicate, Macclesfield Electric Lighting and Power Company, Mexican Gas and Electric Light Company, Missenden and District Electric Light and Power Company, Morton Pringle Gas Heating Company, National Automatic Light Controller (Sparks' Patent) Company, New Export Incandescent Lighting Company, Newport (Essex) Gas Company, Pen-y-Gros, Llanllyfni, and Nantlle Vale Gas Company, Plaissetty Foreign Rights Company, Porthcawl Water Company, Rural Districts Gaslight Company, Safety Auto-Light Company, Self-Lighting Gas Company, Simplex Gas-Engine Starter, Solid-Top Incandescent Mantle Company, Sphere Lighting Company, Standard Acetylene Gas Company, Stansted Mountfitchet Gas Company, Sunlight and Safety Lamp Company, Teneriffe Water Company, Theale Gas and Coke Company, Thomas Lighting Company, "Thorium" (Metal Filament) Lamp Works, Tintwistle Water-Works Company, Tourtel Pressure Lighting Company, Universal Lighting Syndicate, Water and Gas Debenture and Share Investment Trust, Water Circulating Gas-Cooker, Whitland and District Water and Gas Company, "Z" Electric Lamp Syndicate, Fixarc Lamp Company, Innellan Gaslight Company, Musselburgh Gaslight Company.

CARLISLE CORPORATION GAS UNDERTAKING.

Annual Report of the Gas Engineer.

The Gas Engineer and Manager of the Carlisle Corporation (Mr. H. E. Bloor) has made his report on the working of the undertaking in the twelve months ended the 31st of March last. It furnishes the following particulars.

Dealing first with the effect of the coal strike, Mr. Bloor estimates that it will be not less than £500. A stock of coal has, however, been accumulated at the chemical works which will jusify the Committee regarding with indifference any possible future interference with the supplies. A concession was made to the prepayment meter consumers within the city by increasing from 30 to 33 cubic feet the quantity of gas supplied for 1d. This cost the department about £400 for the year; but it doubtless encouraged to some extent the use of gas by the class of consumer named. With regard to finances, the total capital expenditure up to March 31 last was £148,075, and the outstanding debt £21,443. This works out to 1s. 3·23d. per 1000 cubic feet of gas made, which Mr. Bloor says is probably the lowest figure ever recorded. The income on revenue account was £48,386, and the expenditure £34,541; showing a gross balance of £13,845. Adding a sum of £97 for bank interest, a total credit of £13,942 is produced. This sum would have considerably exceeded £15,000 but for the special circumstances alluded to in the report. The income from the sale of gas to private consumers was £33,494, or rather less than the record established last year. This arose from a slight reduction in the quantity of gas sold and the extra 3 cubic feet allowed to the slot-meter consumers.

Looking to the future, Mr. Bloor says there is no doubt the prosperity of the gas undertaking depends on the success of the Gas Committee's efforts to increase the consumption. This he considers is a matter deserving of their most earnest consideration. He points out that nearly every building in the city is piped for gas; and the same remark applies to the majority of the buildings in proximity to the mains throughout the area of supply. There is now strenuous competition in the demand for gas for industrial purposes from various sources; and the lighting load is threatened by electrical competition backed by a full use of differential prices. He says it is obvious from this that, if the position is to be maintained, individual consumers must be prevailed upon to adopt gas to a much more considerable extent for domestic heating and cooking, and also that a fuller demand for gas for industrial purposes must be created.

Reviewing what has been done in the direction indicated, Mr. Bloor says: "During the past three years a strong endeavour has been made to interest the consumers in the use of gas for other purposes than lighting; and the measure of success achieved far exceeds anything which was to be expected. The demand for gas-fires was nine times as great in 1910-11 as in 1908-9; while the balance of cookers fixed over cookers returned to the works has changed from an actual loss of 71 in 1909-10 to an increase of 403 in 1911-12. The demand for outside gas-lamps for shop lighting has been cultivated by every possible means, and the results are very gratifying." Striking though the above figures are, Mr. Bloor is satisfied that they could be substantially improved

upon if proper encouragement were given to the consumers; and he trusts it will be made a settled part of the Committee's policy to reduce the price of gas and improve the terms upon which they supply apparatus as often as the position of the undertaking and the requirements of the city fund permit.

CORPORATION GAS-COAL CONTRACTS.

At their meeting last Thursday, the Rochdale Corporation Gas Committee accepted tenders for coal totalling 55,000 tons. The average increase in price, compared with last year, is 2s. per ton, which will represent to the department an increased cost of £5500. This, with the additional expenditure by increased wages to workmen, and from other causes, is regarded by the majority of the members of the Gas Committee as a sufficient answer, for the present, to the demands made by the local Trades Council for a further reduction in the price of gas. However, this is a matter which has been referred to the Works Sub-Committee again, together with a return showing the charges in 36 other towns.

In submitting the minutes of the Gas Committee for confirmation at last Wednesday's meeting of the Heywood Town Council, Mr. Healey made a statement as to the increased price the department had to pay this year for coal. The Committee, he said, had accepted tenders for about 10,000 tons of coal, and the average increase in price over last year's contracts was 2s. per ton. As they used about 12,000 tons in the twelve months at the gas works, this meant that coal was to cost them £1200 more than last year. This, and the added expenditure on the wages bill through concessions to the men, practically wiped out the profit that they made last year on the gas undertaking. He warned members, therefore, that they must not look forward to the usual profit from the gas-works unless they had a boom in trade and an increased consumption of gas. He supplied some figures showing how coal had advanced in price in recent years. In 1893, the department paid on the average 9s. 6d. per ton for coal; in 1898, the price had fallen to 8s. 6d.; but in 1903, it had risen to 10s. 6d.; and five years later the charge was 12s. 3d. Since then the tendency had been upward; and this year they were paying over 14s. per ton.

ELECTRIC LIGHT FAILURE IN NORTH LONDON.

Islington in Darkness.

Owing to the fusion of wires in a junction-box, a fire broke out at the electricity generating station of the Islington Borough Council, in Eden Grove, Holloway, about half-past eight o'clock on Monday evening last week, with the result that most of the streets, a large number of shops, and many private houses were plunged into darkness. The Fire Brigade were soon on the spot, and the fire was extinguished in less than half-an-hour; but it had severed the cables going to one of the switchboards, and the whole of the supply was cut off as a precautionary measure. After the fire was overcome, the switchboard, wires, and every section of the plant had to be thoroughly tested before the current could be turned on again; but repair work was started as soon as possible, and continued all through Monday night. The efforts of the Chief Electrical Engineer (Mr. Albert Gay) and the staff under him were so successful that shortly after one o'clock on Tuesday morning the public lamps were again alight. By six o'clock, current was available, except in certain districts, for power purposes; and an hour later all factories had a supply. In the course of the day, the private service was restored; and by three o'clock in the afternoon the last switch was connected. Though the repairs effected were of a somewhat temporary character, it was thought that no further trouble would arise.

As the area of the Council extends from Highgate to the City Road (nearly five square miles), and has a population of about 335,000, the consternation caused by the sudden extinction of the electric lights in the main thoroughfares may well be imagined. Fortunately, however, in the side streets and in the majority of the shops and houses gas is in use; and consequently the serious dangers arising from absolute darkness were averted. Many establishments, where electric lighting was entirely depended upon, were at once closed; and in others an attempt was made to carry on the business by means of oil-lamps and candles. Where gas had been retained—and this had been done in a large number of cases—it was, of course, promptly brought into use. Important auxiliaries in providing illumination in the streets were the public-houses, which for the most part were fitted with incandescent gas-burners, and were not inconvenienced by the accident. In some cases, however, candles had to be resorted to. A few places of entertainment had their own supply of current, and the managers were able to continue the performances; in others, efforts were made to do this by the aid of various strange methods of illumination. The effect of cutting off the current was serious in the cases of the Northern General Hospital, where an operation had just been concluded, at the Holloway and Pentonville Prisons, and at the Northern Telephone Exchange. But gas was available in the wards of the hospital and the corridors of the prisons, as well as at the exchange; and its readiness to serve was immediately testified. The tramways in the borough are in the hands of the London County Council, and therefore are independent of the local generating station. They consequently were able to run without interruption.

Reference has already been made in the "JOURNAL" to the large gas-power station which has been constructed by order of the Japanese Government in connection with the generation of electricity for working the line of railway between Tokio and Yokohama. The gas-producers have been supplied by the Power-Gas Corporation, of Stockton-on-Tees. Complete plant for the recovery of the sulphate of ammonia will be provided; and it is expected that the sale of the sulphate will cover the cost of the fuel. The current number of "Engineering" contains a two-page plate furnishing details of the gas-engines, the order for which was secured by the Lilleshall Company, of Oakengates; and a similar plate, with other engravings, is promised for the next issue.

GAS WORKERS' GRIEVANCES IN LIVERPOOL.

Criticism of Co-Partnership.

Under the auspices of the Gas Workers' and General Labourers' Union, a meeting was held in Liverpool last Tuesday night for the purpose of considering the position of the men employed by the Liverpool United Gas Company under the co-partnership scheme which has been instituted recently.

The General Secretary of the Union (Mr. J. R. Clynes, M.P.), in criticizing the scheme, said it was produced by one side only; nobody to present the men's side of the case being taken into confidence. Therefore there was nothing in the nature of the co-partnership essence, which was an agreement voluntary on both sides, about the scheme. The agreement, it was true, did confer certain monetary advantages on the men; but they were outweighed by the disadvantages incurred. The scheme took away the working men's weapon—the power to strike, and placed them in a greater condition of subservience than they were before. If it was going to give the men some of the profits hitherto taken by the shareholders, well and good; but if the extra remuneration was to come about by the increased control of the men, so that they had to do more, and make more, it was not co-partnership, and could not conduce to confidence either on the part of the directorate or the men. While opposed to strikes, if the so-called agreement stood in the way of remedying an intolerable situation by the only working-class means, he would be the first to recommend the men to trample upon the agreements and exercise their right of united action. If the Directors wanted to earn the men's undying gratitude, they could reduce the hours of labour and increase the rate of wages to the standard set before them a few months ago.

Mr. Will Thorne, M.P., said the workers in the retort-houses in the London gas-works received 6s. 3d. per day, compared with 5s. paid to the Liverpool men, who, with a few small exceptions, were the lowest paid for this work in any town in the country. In some cases double time or time-and-a-half was paid for Sunday work; and he claimed that the Directors of the Liverpool Company ought to pay their men more, in order to put them on an equal footing with men in other parts of the country. Co-partnership agreements generally meant the speeding-up of the men.

GAS-COOKERS AND PRICES AT HALIFAX.

Concession to Large Consumers.

A Special Meeting of the Halifax Town Council was held last Wednesday to consider proposals of the Gas Committee to reduce the charge for gas consumed in excess of 6 million cubic feet per annum to 1s. net per 1000 cubic feet, and to allow discount and rebate in respect of gas-cookers fixed by private traders. The proposals were before the Council a month ago [see *ante*, p. 465], but were withdrawn in order that the members of the Council might have before them a report on the matter. This report states that the Committee have been particularly fortunate in arranging for the supply of cookers on terms so favourable that they are in a position to sell the cookers at a price which leaves them 15 per cent. profit after setting aside 10 per cent. for the cost of handling. The Committee decided to allow local dealers in gas-stoves a discount of 15 per cent., to enable them to supply an approved article at the Corporation price, and to contribute to the trader 5s. towards the cost of fixing.

The adoption of the minutes of the Committee having been formally moved,

Mr. C. H. SMITHSON, in seconding the motion, said the proposal in regard to the price of gas would affect the very large consumers; but there was a strong desire on the part of the Committee that there should be a general reduction of charges for all consumers. They gave evidence of this desire in March; but they had not brought forward the whole scheme again because, owing to the uncertainty of the price of coal, it was desirable that the Committee should know more definitely what their profits were likely to be. The present scheme was to meet an application for an additional 15 million cubic feet of gas, and at the same time to make a further profit of from £300 to £500 per annum. The customer concerned already consumed 7½ million cubic feet, at the top rate of 1s 10d.; and in order to strike a satisfactory average it was necessary to propose a scale which should represent 1s. per 1000 cubic feet for anything above 6 millions consumed. This large additional supply would be required in the daytime, and would not involve any extra fixed charge or capital expenditure, or extra cost of distribution and collection. It was reasonable to set against a large production of this description only the amount which would represent running charges, and these would be something like 3·47d. per 1000 cubic feet. Any private firm which could produce an article for 4d. and sell it at 1s. would jump at the opportunity of making so handsome a profit. The differential charges for gas supplied for heating and for power were proposed in order to rectify an anomaly which already existed. At present 1s. 10d. was charged for heating and 1s. 7d. for power purposes. Now it was proposed that gas consumed for heating in excess of 6 million cubic feet should be obtainable at 1s. net so as to strike an average of 1s. 5d. for the 12 millions. In the case of gas used for power, it was proposed that for gas consumed in excess of 6 million cubic feet the charge should be 1s. 3d. net in order to strike a general average of 1s. 5d. He would much prefer a sliding-scale which would make a uniform charge for heating and power. But the scheme would involve a loss of revenue of £1100; and until it was seen what the profits of the department would be, it might be desirable to postpone the adoption of the scheme.

Mr. A. TAYLOR, a Labour member, moved an amendment, that the minutes be referred back to the Committee with instructions that they should bring forward a scheme for a general reduction of the charges for gas. The present proposal would benefit only about two or three large consumers.

Alderman MORLEY, in seconding the amendment, said the small consumer had not been justly treated.

Mr. H. CLAY remarked that if some concession were not made to induce large consumers to increase their gas consumption, the Committee would lose what they already had, because it would be worth while for those consumers to have plants of their own unless they could get gas from the Corporation at market price.

The amendment was defeated—only the mover voting for it; and afterwards the minutes were adopted.

THE NATIONAL OIL SUPPLY.

Its Production in Vertical Shale Retorts.

This was the subject of a letter by Mr. W. R. Herring in the Engineering Supplement of "The Times" last Wednesday. In the course of it, he made the following remarks.

That the future of the oil-engine will depend upon a comparatively crude product, as contrasted with the present practice requiring a refined product for its practical utilization, is a certainty in the minds of those who are able, from their experience, to penetrate in some degree the future commercial conditions. At the moment, the distribution of natural oil is widespread, and more or less abundant; but, from both an Imperial and a commercial point of view, if oil is to be the prime source of future power, it is clear that our own country must be independent of imported supplies.

The principal source of oil production in the United Kingdom is the oil-works in the central part of Scotland, where oil is distilled from a carbonaceous shale, and is carried on to the extent of utilizing some 3½ million tons of raw material per annum. Geologically there is an enormous area of oil shale of various qualities in Scotland, and similar oil-bearing shales exist in some parts of England; and little impetus is necessary to greatly multiply or increase supplies of oil from this source, given a moderate degree of protection against cut-throat competition from abroad.

It has been suggested that ordinary coal may in the near future be utilized for the production of a fuel oil and other products on a much larger scale than is at present practised; and, chemically speaking, there is no reason to question the possibilities of such a source of supply. There are, however, vast areas of material in our own country better suited for the production of oil than common coal—viz., the cannel coal, which up to a few years ago was the principal enriching material used in gas-works. Owing to the change in the conditions of domestic gas supply and the abandonment of the light value for the calorific or heat value, which is now being established by parliamentay enactment, it is found that the common coals yield the necessary standard of light and heat without artificial enrichment. This material, therefore, is now unmarketable; and, as it is unsuitable for industrial and domestic use, it is being left unmined in the earth. The practicability, therefore, of drawing upon these sources of supply of raw material for the manufacture of oil is within the bounds of commercial possibilities; and their utilization presents no difficulties to either the chemist or the engineer.

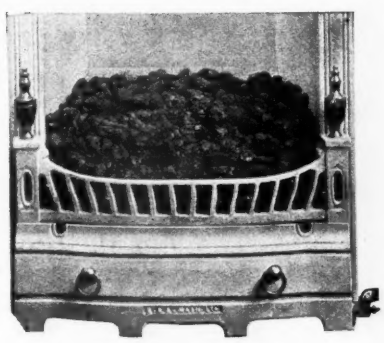
In practice, it will be necessary to merge the fundamental principles underlying coal-gas manufacture and oil-shale distillation, and apply them to the newer purpose, beginning with low-temperature carbonization and finishing with high-temperature treatment, which can be carried on in the same apparatus by a graded process of applying the heat; the low temperature being employed to distil off, under proper conditions, the oil and volatile matters, and the high temperature for the final exhaustion of the gas from the material, and the evolution of ammonium compounds, aided as this is in the Scottish oil-works by the application of a large volume of steam at the base of the charge in the retort. It is difficult to conceive a better type of apparatus for this purpose than the vertical retort, which by a simple device can be graded in heat from the temperature of 200° or 300° at the upper end to 2000° or 3000° at the lower end, and thus ideal conditions brought about for gradually subjecting the raw material, as it descends in the retort from the upper to the lower end, to a gradually increasing temperature. There is no physical objection to treating common coal in exactly the same way.

The oil shales of Scotland yield a solid residue useless for any practical purpose; so also do the majority of the cannel coals, although there are some which will yield from 10 to 12 cwt. of good usable fuel per ton of material employed. If, however, we consider the possibility of utilizing common coal, a different set of factors comes into play, as such coals are much less rich in oily matters, but are much richer in solid fuel properties; the resulting residue from distilling a ton of common coal being from 12 to 15 cwt. of what is commonly known as gas coke—a fuel eminently suited for domestic and trade purposes, and for the production of power gas for driving gas-engines. The resulting oils, however, would not be nearly so voluminous, nor of such value, as from the cannels and shales; but as in London coke is worth 1s. per cwt., this residue alone will in a large measure pay for the cost of raw material, and will compensate for the deficiency of yield of oil.

The problem also presents economic factors of world-wide importance. The exhaustion of agricultural lands throughout the world is necessitating a constantly increasing use of artificial fertilizers, the source of which is primarily the iron-works, gas-works, and shale-oil works of the world. Each ton of coal used for trade or domestic purposes can, if used as in gas-works, be made to yield, roughly, ¼ cwt. of sulphate of ammonia, worth, roughly speaking, 2s. 6d., after paying costs of manufacture. This is entirely lost when coal is used, as at present, for the production of power in steam-boilers; whereas, if it were used for oil-fuel production, there would be recovered, by the special methods employed, nearer ½ cwt. of sulphate of ammonia per ton of coal, or twice the amount that can be recovered by the present gas-works process—not only yielding a large sum in return, but adding materially to the sources of nitrogenous fertilizers, with which the existing agricultural lands of the world must be served in ever-increasing quantities to maintain the food supplies.

The "Adaptable."

THE "MAIN" METHODS AND RESULTS.



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PRICE OF GAS AT LEIGH (LANCS.).

Concession to Prepayment Meter Users.

The Leigh Town Council, at last Wednesday's meeting, confirmed a minute of the General Purposes Committee to the effect that, from the 1st prox., the prices charged for gas supplied to consumers by prepayment meter should be reduced from 3s. 4d. and 3s. 8d. (free fittings) to 3s. 3d. and 3s. 6d.; the question of a further reduction to be considered at the end of the present financial year. An amendment, moved by one of the Labour members, that the reduction be to 3s. 2d. and 3s. 4d. respectively, was defeated by 13 votes to 9, after a long discussion. The charge to ordinary consumers is 3s. 3d.; but with a discount on prompt payment the net price is 3s.

The members of the Council in favour of the amendment argued that the prosperity of the gas undertaking was due chiefly to the prepayment meter users, who numbered about 6100, and to the so-called "free-fittings" consumer; that if any reduction was due, it should be to the people who had been the basis of the prosperity of the Gas Department; that it was an injustice to take advantage of people's inability to buy gas in the bulk, and to make them "pay through the nose" for the very same commodity that other people, who could afford to pay, were getting at a lower price; that while the ordinary consumer had his gas at 3s. net, the prepayment meter user was charged 3s. 4d., and the "free-fittings" consumer 3s. 8d.; that if there was anyone who ought to pay for fittings it was certainly the owner of the property, not the users of gas, because they added to the value of the property, which very often meant increased rent; and, finally, that prepayment meter users had relieved the department of bad debts. It was contended, in support of the motion for the confirmation of the minute of the General Purposes Committee, that it would be unwise, at the present juncture, to make any further concession, especially seeing that the profits were likely to be about £2800 less this year than last; that to adopt the suggestion of the supporters of the amendment would be treating the ordinary consumers unfairly; and that, with the exception of one or two cases, the prices charged at Leigh were considerably less than those paid in other towns for gas supplied through prepayment meters.

Alderman Boydell said that the Gas Department ought to be worked at a paying price and that neither too little nor too much should be charged for gas. He did not believe in one department working for the benefit of another. In his opinion, the proposed reduction would lead to increased consumption, which would mean more profits. He recalled the fact that since the Corporation acquired the gas undertaking the rates had been relieved to the extent of £36,000 out of the profits; and he declared that if the Council would let the Gas Department stand on its own foundation, it would be in a much stronger position than it was to-day.

The Flow-Meter Company, Limited, has been registered with a capital of £2500, in £1 shares.

ARTESIAN WELL BORINGS IN LONDON.

Capacity of the Chalk Strata.

Under the heading "The Estate Market," in a recent issue of "The Times," the following remarks were made on the subject of an artesian well which is being bored in Aldwych.

Like many other building owners in London, the Australian Government have decided to equip their new premises at the eastern end of the Aldwych island with an independent water supply. The chalk strata have just been reached in the boring for the artesian well. Overlying the chalk in the London basin are, in ascending order, the Thanet sands, Woolwich and Reading beds, London clay, and surface gravels and clay, though the full sequence is not found in all parts of the area. The boring in Aldwych begins in the London clay. The surface formations have been removed in the excavation for the building. The upper formations in the London basin are now, practically speaking, devoid of water, while the amount obtainable from the chalk varies considerably. But over the greater part of London a good and uniform supply may be anticipated. The boring in Aldwych will probably be continued to a depth of 450 feet from the surface before the requisite inflow of water is secured. The large number of wells sunk in London during recent years has greatly increased the quantity of water drawn from the chalk, and the standing level of the water is slowly but surely falling. Consequently, the depth to which it is necessary to bore has also increased. It must not be assumed, however, that there is any immediate danger of exhausting the supply from the chalk.

As pumping costs are low, the capital outlay on the installation of wells is soon recouped by the saving in water-rates; and many large buildings in the City and elsewhere now have an independent supply. Fourteen artesian wells were sunk in the City between 1836 and 1907; and upwards of twenty have been sunk since that year. As the Water Board largely tap the supply before it reaches the City, there is a certain element of speculation in sinking wells; but it is one that the Baltic Exchange, the Bank of England, and the owners of various large blocks of buildings, have been content to face, and with very satisfactory results from their own point of view. Some time ago, it was estimated that the Water Board were losing £6000 a year through the sinking of wells by private undertakings.

In view of the fact that the information contained in the preceding remarks was calculated to encourage people requiring water in London to endeavour to obtain it by sinking wells, Mr. W. Vaux Graham, M.Inst.C.E., whose name has on several occasions been mentioned in the "JOURNAL" in connection with water undertakings, ventured to offer the following observations by way of warning.

For years past there have existed in London a large number of

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artesian wells, many of which, but by no means all, have yielded a satisfactory supply of water. Since the establishment of the Metropolitan Water Board, this number has been very largely increased; and there are the strongest possible indications that the draught upon these wells is becoming greater than the chalk will supply. In the early days of the artesian well in the London basin, the water overflowed at the surface. So far is this from being the case at the present time, that the standing level of the water is a considerable depth below the top of the chalk, or from 200 to 300 feet from the surface of the ground, according to the position of the well. It has long been known that the chalk under London is replenished from the outcrop at a much slower rate than the water has been withdrawn. Before the recent increase in the number of wells, the standing level of the water was falling at the rate of about one foot a year; and it is now going down at a greatly accelerated rate. When it is remembered that the water beneath London is standing a great many feet below sea level, it is evident that as the draught upon it increases there will arise a danger of brackish water from the Thames finding its way into the wells. In my judgment, a rude awakening awaits those who believe that an unlimited supply of pure water can be permanently obtained from the chalk under London.

WATER SUPPLY FOR DISS.

Particulars of the Works.

The works which have for some months been in progress for the supply of Diss with water are nearing completion. They have been designed by Mr. W. H. Booth, F.G.S., on the basis of a supply of 20 gallons per head per day to 4000 people. There are two bored tube wells, 400 feet deep, lined with steel tubes, 10 inches diameter, to a depth of 160 feet below the surface. These boreholes enter below the lining tubes a further 240 feet into chalk, the upper surface of which was found about 97 feet below the surface of the ground. In each borehole is a pump 8 inches diameter and 3 feet stroke. A gas-engine supplies the motive power for each pump. When the two pumps are running at slow speed, they will throw 80,000 gallons of water in ten hours. In case of the overhaul of one pump, the other can be run at a higher speed, so as to deliver 80,000 gallons in less than 14 hours. From the pumps the water passes to the softening plant, and thence back to other pumps, which raise the softened water to the tower.

The water-tank measures 34 ft. 6 in. by 27 ft. 6 in. and 5 ft. 3 in. deep; and it is designed to contain 30,000 gallons. It is carried by steel girders disposed as a grillage upon a tower of brick 33 ft. by 26 ft. over all, and 46 feet high from the ground to the tank bottom. The tower, which is of brick, is of plain design, with four corner piers, fourteen intermediate piers, and eight solid panels. The remaining panels, ten in number, are lightened with windows or doors, and each of the eighteen terminates in a circular arch which is flush with the outer face of the piers, and serves to carry the straight entablature on which the wall-plates of the tank girders are bedded. Inside the tower is a floor, 12 feet above the ground. One half of the ground floor is occupied by an office, workroom, &c., and the other by the engine-room, in which are two gas-engines to drive the two pumps. On the north side of the tower a lean-to roof covers the gas-producers. The softening plant stands about 20 feet north of the tower.

The town mains start with a diameter of 6 inches, and they are ultimately reduced to 3 inches, at which they reach the twelve terminal points. Valves are provided by which the town can be cut off in sections. The elevation of the site of the water-works is 138 feet above the sea; and the additional head of water is 51 feet—the tank roof being nearly 200 feet above sea-level. The head of water will exceed 100 feet over a great portion of the town.

NOTES FROM SCOTLAND.

From Our Own Correspondents.

Saturday.

Arbroath.—At a meeting of the Town Council on Monday, Treasurer Thomson, in moving approval of the annual statement of accounts, reported as follows on the gas accounts. In the revenue account, £13,339 2s. 7d. was received for gas sold, £4134 4s. 3d. for residual products, £35 6s. 3d. for rents, feu-duty, &c.—in all, £17,508 13s. 1d. Deducting from this £12,543 12s. 2d. for working expenses, there is a credit balance of £4965 0s. 11d. From this balance were paid: For annuities, £1326 10s.; interest, £701 6s. 8d.; sinking fund, £575; contingency and depreciation, £1982 8s. 5d.; Arbroath Harbour Trustees, £250—in all, £4835 5s. 1d.; leaving £129 15s. 10d. Adding to this sum £73 16s. 4d., the amount on hand at the beginning of the year, there remains a balance of £203 12s. 2d. The sinking fund account had a balance in hand of £2 10s. 7d. at the beginning of the year, and £575 was set aside during the twelve months; making £577 10s. 7d. to the credit of this account. The sum of £1982 8s. 5d. was paid from the contingency and depreciation account, being the balance of expenditure on the new holder. The estimates of the receipts and expenditure of the gas-works for the ensuing year, as made up by the Manager, were submitted. The estimated expenditure was £18,037 4s.; receipts, £17,816 17s. 9d. There was thus an apparent excess of expenditure over receipts of £220 6s. 3d.; but as the estimates were based on the gas sold last year, there was a prospect of a considerable increase in the production being required. The Committee considered the proposed special scale of charge for gas to be used solely for industrial purposes in large quantities; and the Manager submitted a report suggesting the following special rates: For quantities exceeding 500,000 and under 750,000 cubic feet, 2s. 2d. net per 1000 cubic feet; exceeding 750,000 cubic feet and under 1,000,000 cubic feet, 2s.; exceeding 1,000,000 cubic feet and under 1,250,000 cubic feet, 1s. 9d.

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exceeding 1,250,000 cubic feet, 1s. 9d., less 5 per cent. discount. These prices to be subject to the same fluctuation as the price of gas to ordinary consumers, but not to the discounts allowed for large consumptions. The accounts and report were approved.

Dumbarton.—On Tuesday, Provost Buchanan opened a three days' exhibition of gas cooking, heating, and lighting appliances in connection with the Dumbarton Corporation Gas Department. The Provost, who was supported by other councillors, in the course of his remarks said the Committee in charge of this matter had looked into the subject very carefully, and had arranged the exhibition to bring before the people of the town the advantages of gas as opposed to electricity. He afterwards introduced Miss E. M. Dodds, M.C.A. (late Principal of the Dundee School of Cookery), who gave practical demonstrations in cooking by gas to a large audience of ladies. Many of the latest and most up-to-date gas appliances were shown in operation.

Dunfermline.—The Town Council at a meeting some months ago decided to lay a high-pressure gas-main from their works to Culross, with the object of supplying the burgh and intervening villages. They have proceeded to lay the pipe, notwithstanding the threatened opposition of the Fife Coal Company, who proposed to instal a manufacturing plant of their own to provide gas for lighting and heating purposes for their growing district of Valleyfield. Now, however, the Town Council have found themselves up against other opposition. The Town Council of Culross have unanimously decided to prevent them passing the burgh boundaries with their pipe. It is believed that the Culross Council have taken this step because they feel that some of the conditions submitted by Dunfermline for the provision of gas will impose too heavy a burden on ratepayers who reside some distance away from the proposed branch mains. The Dunfermline Town Council cannot now withdraw from their project, which, it is believed, will be made a paying concern apart from whether Culross accepts the gas.

Inverkeithing.—The Inverkeithing Gaslight Company have shown considerable enterprise of late in meeting the demand for increased lighting facilities in the burgh and neighbourhood. They have greatly extended their works and introduced modern gas-making plant, and are completing an extensive addition to the storage capacity of the gas-holder they erected two years ago. They have also taken over the lighting of all the street-lamps and introduced incandescent fittings throughout the town, and have extended their mains for miles in several directions beyond the burgh boundaries.

Kirkcaldy.—A general meeting of the shareholders of the Kirkcaldy Gaslight Company was held on Wednesday, to consider, and, if thought fit, to pass the following resolution: "That this meeting remits to the Auditor of the Court of Session to fix the amount of the Liquidator's fee." Mr. Adam Macpherson presided. Mr. J. L. Innes moved, and Mr. R. C. Lockhart seconded, as an amendment: "That any reference to the Auditor of the Court of Session to fix the Liquidator's fee be delayed until the questions in dispute between the Liquidator and the shareholders have been adjusted, or until a remit has been made by the Court to fix said fee in the event of these questions being brought before the Court, and in either case that the shareholders be separately represented before the Auditor or other Referee, and that their expenses be defrayed out of the funds now in the hands of the Liquidator." The resolution was carried by 6769 votes against 466, including a large number of mandates.

Kirkconnel.—The innovation of a gas supply at Kirkconnel has been marred by an unfortunate accident which occurred in the village on Monday afternoon, and resulted in the death of Mrs. John Sommerville, the wife of a miner. It appears that the Company are installing gas into Kello Bank, and the service-pipe was already in the house tenanted by Sommerville. The gas was turned on at the works about nine o'clock on Monday morning. It is supposed that the gas had been escaping from the pipe at the place where the connection was made with the meter, the stopcock having been left open; and it is assumed that Mrs. Sommerville was overcome by the fumes.

Milngavie.—The Town Council have just issued, in printed form, a statement of receipts and expenditure for the past year. After various deductions, including £2028 15s. for gas and water pipes, the valuation of the burgh amounts to £22,447 5s. 6d.

CURRENT SALES OF GAS PRODUCTS.

Sulphate of Ammonia. LIVERPOOL, *Sept.* 14.

Within the last few days there has been some falling off in the demand for this article, and, consequently, values have shown a drooping tendency. Buyers have apparently covered their more urgent requirements, and have decided to await developments before committing themselves further to the present level of prices. The closing quotations are £14 10s. per ton f.o.b. Hull, £14 11s. 3d. per ton f.o.b. Liverpool, and £14 12s. 6d. per ton f.o.b. Leith. The easier feeling in the near position has been inclined to act as a check to purchasing for future delivery; but producers maintain their quotations at £14 15s. to £15 per ton f.o.b. at the principal ports, according to the period of shipment.

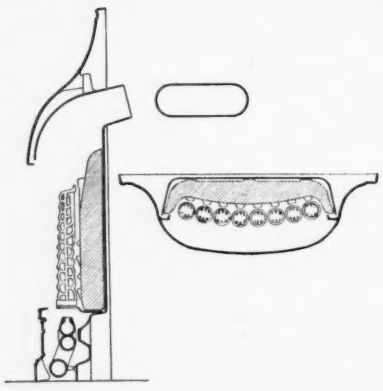
Nitrate of Soda.

There is no change in either the tone or the value of this material, and holders remain firm at 11s. 4½d. per cwt. and 11s. 6d., on spot, for ordinary and refined qualities respectively.

Tar Products. LONDON, *Sept.* 16.

The markets for tar products remain very steady. Although on the whole the market for pitch continues fairly firm, some sales are reported to have been made during the past week at slightly lower values. Benzols are very firm; and there is a good inquiry both for prompt

Davis canopy construction dealt with in detail. . .



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The Canopy cover at **sides** is ample to allow for the spreading of gases by the fuel. The gases then naturally travel to the highest point of the Canopy flue nozzle **without encountering sharp angles or other obstacles on the way.**

The result is a canopy of such scientific accuracy that a Perfectly Hygienic Gas Fire is assured.

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and forward delivery. Solvent and heavy naphthas maintain their price, and there is a fair amount of inquiry for each grade. Crude carbolic does not appear quite so firm. Creosote is in good demand, and some high prices are being paid in every quarter.

The average values during the week were: Tar, 29s. 6d. to 33s. 6d., *ex* works. Pitch, London, 49s. 6d. to 50s.; east coast, 49s. to 49s. 6d.; west coast, Clyde 51s. to 52s., Manchester 49s. to 50s., Liverpool 49s. to 50s. Benzol, 90 per cent., naked, London, 1s. 1d. to 1s 2d.; North, 1s. to 1s. 1d.; 50-90 per cent., naked, London and North, 10½d. to 11½d. Toluol, naked, London, 11½d. to 1s.; North, 11d. to 11⅝d. Crude naphtha, in bulk, London, 5⅝d. to 6d.; North, 5d. to 5⅝d. Solvent naphtha, naked, London, 1s. 1½d. to 1s. 2d. f.o.b.; North, 1s. 1d. to 1s. 1½d. f.o.b. Heavy naphtha, naked, London, 11½d. to 1s. 0½d. f.o.b.; North, 10d. to 10⅝d. f.o.b. Creosote, in bulk, London, 3d. to 3¼d.; North, 2⅞d. to 3d. salty, 3⅛d. to 3¼d. liquid. Heavy oils, in bulk, 3¼d. to 3⅜d. Carbolic acid, casks included, 60 per cent., east coast, 2s. 6d. to 2s. 7d.; west coast, 2s. 5d. to 2s. 6d. Naphthalene, £4 10s. to £9 10s.; salts, 45s. to 50s., bags included. Anthracene, "A" quality, 1½d. to 2d. per unit, packages included and delivered.

Sulphate of Ammonia.

Although the market has been dull during the past week so far as new business is concerned, yet prices have been maintained, and tender parcels have fetched almost full values. Manufacturers maintain their strong opinion as to forward delivery, and are, therefore, still quoting high prices. Actual Beckton is quoted at £14 2s. 6d. Outside London makes are £13 17s. 6d. to £13 18s. 9d.; Hull, £14 10s.; Liverpool, £14 12s. 6d.; Leith, £14 15s.; Middlesbrough, £14 10s.

COAL TRADE REPORTS.

Northern Coal Trade.

There is a steady demand for coals, though the lack of ready steamers is limiting the quantities shipped. In the steam coal trade, best Northumbrians are from 14s. per ton f.o.b., second-class steams are unaltered at 12s. to 12s. 6d., and steam smalls are from 8s. 6d. to 9s. 6d. In the gas coal trade, there is a fuller consumptive demand, which should steadily increase for three months, and which takes up the production better. Best Durham gas coals are about 12s. 7½d. to 13s. per ton f.o.b.; second-class gas coals are from 12s. to 12s. 6d.; and for "Wear specials," from 13s. 6d. to 14s per ton is quoted. Some sales of gas coals are being made for the Mediterranean ports, but the high rate of the sea freight renders the price high delivered, for some of these freights are greater than for ten years. Gas coals are in demand for these ports, but sales are only slowly negotiated at present, though there has been some forward selling, and more should soon be reported. About 12s. 6d. for best gas coals, and over 13s. for freight, shadows something like the high prices spoken of. Coke is firm. Good gas coke is about 20s. 6d. to 21s. per ton f.o.b. in the Tyne.

Scotch Coal Trade.

A very healthy tone pervades the coal trade throughout Scotland; and such is the demand all round for every class of fuel that the result is a tendency towards even higher values generally. Owing to the scarcity of tonnage, exports are not so heavy or strong. On Friday, the prices on the Glasgow Coal Exchange were: Best navigation steam, 13s. 6d. to 14s. per ton f.o.b. Glasgow; second quality ditto, 11s. 6d. to 12s. 6d.; Lanarkshire Hartley, 14s. 6d. to 14s. 9d.; ell, 12s. to 12s. 6d.; splint, 13s. 6d. to 13s. 9d.

Halifax Gas-Works Fatality.—When engaged on Saturday at the Halifax Gas-Works, a retort-setter named Martin was overcome by gas, and though medical aid was promptly forthcoming he expired an hour later from carbon monoxide poisoning. Two bricklayers who went to the assistance of deceased when he was lying unconscious were also overcome, but they were restored to consciousness and removed to the infirmary.

Dunmow Water Supply.—Last Wednesday, Mr. R. H. Hooper, M.Inst.C.E., held an inquiry at Dunmow, on behalf of the Local Government Board, respecting the application of the Rural District Council to borrow £3000 for the purchase of the Dunmow and Felsted Water-Works, which were constructed four years ago by the Mid-Essex Water-Works Company. Evidence was given as to the construction of the works and the machinery; and subsequently Mr. Hooper made an inspection of them.

Dudley's Unprofitable Electricity Undertaking Sold.—The Dudley Town Council last Tuesday night discussed in Committee, for nearly two hours, the proposal to sell the electricity undertaking. Later, the Mayor, Mr. G. Bean, moved in open Council the adoption of the report of the whole Council recommending that the undertaking be disposed of at once upon the terms set out in a memorandum which had been submitted to them. The motion was seconded by Mr. H. W. Hughes (Chairman of the Streets, Lighting, and Tramway Committee), who said the terms were that the whole of the capital now unpaid, together with the interest which the town had to bear, was to be repaid to the Council at exactly the same time, or within fourteen days of the time, the Council made a payment. Secondly, the balance due to the Treasurer, which was nearly £10,000, the purchasers—and when he said the purchasers he used the word because one was not exactly sure as to who the purchasers were—would repay the money as to £3500 in cash. This would clear out of the way the deficiency of £2662 which was facing the town, and which, if not provided in some other way, would have to be paid out of the rates. The town was given the security of a mortgage on the entire undertaking, and they bound the parent Company to a performance of this obligation. It would free itself absolutely from liability, and obtain a guarantee that the present prices would not be increased. The motion was carried by 21 votes to 8.

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THIS NEW SHELF-TOPPED FIRE, with the "OLAK" (Round-topped) and the "KALO" (Square-topped), completes a triad of popular Stoves—The "O.K." Series.

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The "LOKA."

Little gas for great heat -

ECONOMY.

These Fires are supplied in Best Black, Armour Bright, Porcelain Enamel, and Copper Finishes.

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"Lightning" Electric Cookers.

A correspondent who was interested in reading the remarks with regard to Mr. Napier Prentice's "Lightning" cooker in the "Electricity Supply Memoranda" in the last issue of the "JOURNAL," gives particulars of a case where a near neighbour was persuaded to adopt electric cooking apparatus. It was not long, however, before the gas company received an application to fix a gas-cooker, so that some cooking could be done in the house; or, as the consumer in question said to the resident, "so that we can be assured of a meal properly cooked and at the proper time," for with the electric cooking apparatus they never knew when a meal would be ready, or whether it would be properly cooked. This consumer was so decided that he did not adopt the usual practice of hiring a gas-cooker, but insisted on purchasing one, and wished to have the particular cooker which was on show in the gas company's window. This was an opportunity the gas manager concerned evidently did not care to lose. When the cooker was removed from the window, in the vacant place a card was put bearing the following inscription: "The gas-cooker removed from this position has been sold to replace an electric cooker." Alongside this card there was a gas flash-sign: "The Best Domestic Servant, a Gas-Cooker." After a short time, the manager thought it well to place another cooker in the window, and he had the inscription on the card altered, informing the public that "This is a duplicate of the cooker which had been sold to replace an electric cooker."

Slaithwaite District Council and the Gas-Works.—The Slaithwaite Urban District Council have decided to approach the Slaithwaite Gas Company to ascertain if they are willing to sell the gas-works, and at what price. The Clerk (Mr. E. Gledhill) produced figures showing that compulsory purchase would cost upwards of £42,000, and would mean a subsidy from the rates of £800 a year for thirty years, or equal to an 8d. rate.

Rejection of the Municipal Coal Supply Scheme at Bradford.—At the meeting of the Bradford City Council last Tuesday, the findings of the Sub-Committee who had made a protracted inquiry with regard to the proposed establishment of a municipal coal supply were embodied in the minutes of the Finance and General Purposes Committee. The conclusions arrived at were, briefly, that the Corporation could not buy coal cheaper than coal merchants, and that the profits of the latter did not average 1s. a ton. The opinion of the Committee, having regard to the severe competition which already existed, was that it would be impossible for the Corporation to carry on the trade at a profit. The adoption of the minutes having been proposed, Mr. A. W. Brown moved, as an amendment, that the findings of the Sub-Committee should be rejected, and that it should be declared that, in the opinion of the Committee, substantial advantages in the shape of reduced prices to the citizens would result from the adoption of a municipal coal supply. The amendment was, however, defeated by 43 votes to 15.

Wombwell District Council Gas and Water Supply.

According to the fourth annual report of the Gas and Water Engineer of the Wombwell Urban District Council (Mr. P. D. Walmsley, B.Sc.), covering the year ended the 31st of March, the gross profit on the gas undertaking was £3816; and after payment of £859 for interest, there was left a net profit of £2957, against £2672 for the year 1910-11. This sum has been disposed of as follows: Two new gas-mains, £878; transferred to the Water Department for an old water-main used as a gas-main, £100; transferred in aid of the district rate, £1979. The quantity of coal carbonized was 5507 tons, and 65,324,000 cubic feet of gas were made, or at the rate of 11,862 cubic feet per ton. The make was 3,453,000 cubic feet more, and the sale 5,531,000 cubic feet more than before; the latter increase being directly attributable to main-laying operations carried out during the year. Since 1907-8, there has been an increase of 12,245,000 cubic feet in the make of gas with only 158 instead of 1240 tons more coal used; while the increase in the sale has been 14,378,000 cubic feet, or nearly 34 per cent., and the leakage account has been reduced by 7 per cent. With reference to the Water Department, after charging to revenue the cost of a new 8-inch water-main, the gross profit at the close of the year was £358, of which £242 was required for the repayment of the principal and the interest on loans; leaving a net profit of £116. The total consumption of water in the twelve months was 61,151,000 gallons, or an average of 9·55 gallons per day per head of the population. Appended to the report are working statistics of the two departments.

Fractured Water-Mains under a River.—The water supplied for domestic purposes at Llandudno flows through two 9-inch pipes and a 15-inch pipe, from the reservoir at Llanbedr. The smaller pipes are laid under the bed of the river. On Saturday, the 7th inst., one of them burst, and allowed the water to escape into the river at such a rate that in a very short time the reservoir was emptied, and the water-gauge at Landudno indicated that there was no pressure in the mains. The damaged pipe was promptly shut off, but shortly afterwards, when the pressure rose again, the second main was fractured. This caused further delay in restoring the service.

Rhyl District Council Gas Department.—The Gas Engineer and Manager of the Rhyl Urban District Council (Mr. Leonard G. Hall, Assoc.M.Inst.C.E.) has issued his working statement for the year ended the 31st of March. It shows that the profit on the revenue account was £5270, or at the rate of 22 75d. per 1000 cubic feet of gas sold, and 20s. 11·33d. per ton of coal carbonized—this quantity being 5033 tons. The make of gas was 62,007,000 cubic feet, of which 55,593,800 cubic feet, or 89·66 per cent. were sold. There were 994,200 cubic feet of gas used on the works, and 5,419,000 cubic feet, or 8·73 per cent. were unaccounted for. The make of gas per ton of coal was 12,320 cubic feet. The residuals were: Coke, 3145 tons; tar, 63.330 gallons, or 12½ gallons per ton; and ammoniacal liquor, 159,065 gallons, or 31·3 gallons per ton. The coke sold was 2208 tons, or at the rate of 8¾ cwt. per ton of coal carbonized.

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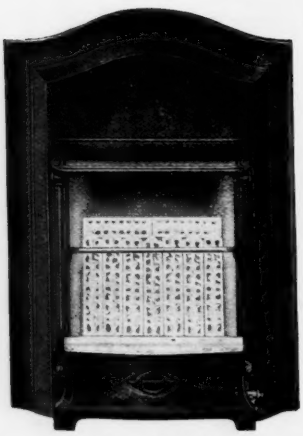
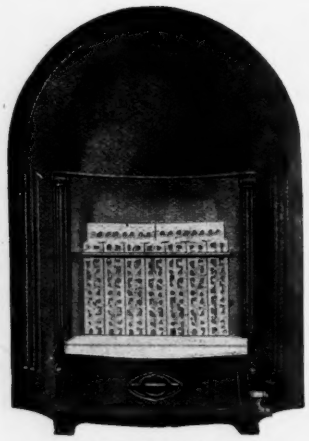


The "IRIS."



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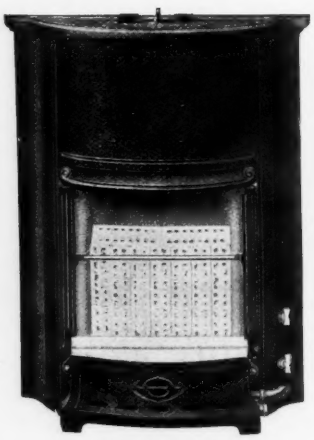

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Water Divining Experiments in the Malton District.—Renewed interest is being evinced in water divining in the Malton district, consequent upon the Norton Rural District Council having engaged a water diviner in connection with a proposed scheme of water supply for Westow, Leadening, and Acklam. The Council in July called him in to indicate the presence of water for the scheme known as the street villages water supply. He visited Amotherby, and pointed out several places where he said an abundant supply of water could be found. The local correspondent of the "Yorkshire Post" was informed by Mr. Henry Tobey, of Malton, the Engineer for the scheme, that boring operations were at present being carried out at a place indicated, and a depth of nearly 30 feet had been reached. Difficulties had, however, presented themselves; the rock being of extreme hardness, so that progress in boring is but slow. He had not the slightest doubt, however, an adequate supply of water would be found in a short time.

Co-Partnership in the Gas Industry.—At the meeting of the British Association, a paper on "Co-Partnership in Industry" was read by Mr. C. R. Fay. Dealing with the subject with reference to the gas industry, he pointed out that co-partnership began in 1889; but since 1907 there had, he said, been rapid expansion, so that there were now 36 companies practising it or profit-sharing, whose total capital was £50,000,000; and the number of employees affected, 22,000. The scheme of the South Metropolitan Gas Company was based on a sliding-scale. The employees' bonus was now 8¼ per cent., and the stock held by them more than £300,000. The advantages of the scheme were: (1) The addition to wages, (2) the promotion of thrift, (3) the creation of good feeling and a sense of co-ownership. Sir George Livesey claimed that the scheme paid the masters no less than the men, and had its influence in reducing the cost of labour and the price of gas. It was difficult, however, to establish exactly this casual connection. The gas industry was peculiar, having a partial monopoly of supply and a steady demand.

Southampton Water-Works Extensions.—The Southampton Corporation having applied to the Local Government Board for sanction to the borrowing of money for the purposes of their water undertaking, including the erection of works in the parish of Otterbourne and the rural district of Hursley, and for the approval of the purchase, for the purposes of the undertaking, of certain lands adjoining the existing works in the parish, an inquiry was held into the matter at the Municipal Offices, Southampton, last Wednesday morning, by Major J. Stewart, R.E., one of the Board's Inspectors. Among those in attendance were Mr. R. R. Linthorne (Town Clerk), Mr. E. C. Rodda (Water Engineer), and Alderman H. Cawte (Chairman of the Water Committee). The amount for which power to borrow is asked is £18,525; and, in answer to the Inspector, the Town Clerk said the Corporation would like the period of repayment to be as long as possible. In the course of the inquiry, the Inspector was told by Mr. Rodda that, if things went well, they hoped to have an increased supply of water by next spring. The evidence was of a formal character; there being no opposition to the application.

Tiverton Water Supply.—An ancient ceremony was carried out on Thursday last at Tiverton, when the municipal authorities and a large number of the inhabitants turned out for the purpose of perambulating the town leat. The object of this custom, which is locally known as "water bailing," is to assert the proprietary rights of the town in the stream, which is the source of the water supply, the gift of which was bestowed on Tiverton in the Thirteenth Century by the then Countess of Devon. The chief item in the ceremony, which is carried out once in every seven years, is the reading of a proclamation of the town's rights. The day's proceedings included a luncheon in a field adjoining the source of the leat, where the Mayor (Mr. A. T. Gregory) fixed an iron tablet with the inscription "Here rises Tiverton Town Leat."

Bury Corporation Gas Finance.—Messrs. C. M. Merchant and Son, Professional Auditors to the Bury Corporation, in their annual report to the Council, state that for the past year contributions in aid of the rates have been made by each of the trading departments except the Electricity Department, where there was a loss of £1276. The profit on the gas undertaking was £9757, of which £4366 was handed over in relief of rates, a similar sum applied to a reduction in gas charges, and the balance carried to the reserve fund. The net price of gas for the past financial year was 1s. 11d. per 1000 cubic feet for lighting and heating, and from 1s. 9d. to 1s. 5d. for power purposes. The outlay upon the gas undertaking at March, 1911, stood at £327,367, and it was increased during last year by further expenditure totalling £3648. The other assets comprise stock of materials, debtors, investments, £71,684, less owing to bankers and creditors £14,531—£57,153, which gives the book value of the undertaking at March 31 last as £388,168. The borrowed moneys outstanding amount to £183,492, and this leaves a surplus of assets of £204,676.

Lighting of Bodmin.—It was reported at a meeting of the Bodmin Town Council last Tuesday that the Lighting Committee had had under consideration a letter from the Gas Company as to the improvement of the lighting of the town, including the installation of automatic controllers; and they recommended the Council to assent to the scheme, provided the Company undertook to leave the lamps in good repair. Mr. Jenkins, opposing the recommendation, said they had been told that Bodmin was the best-lighted town in Cornwall; and he did not think there was need for improvement, especially as it meant entering into a five years' contract. Mr. Bawden remarked that the answer to such criticism was that a great improvement would be effected and the cost of the lighting would be less. Mr. Treleaven, Chairman of the Lighting Committee, explained that under the new contract the Gas Company would supply about 40 new lamps. There would be about 125 automatic controllers, and the Gas Company would keep them in repair for five years free of charge. All the lamps were to have inverted burners, and the cost would be paid in annual instalments extending over five years. It would not cost the ratepayers a penny to effect the improvements, and they would get double the light they now had. The Surveyor estimated that there would be a saving of £40 a year on the gas bill. The recommendation was adopted.

YOUR COLLECTIONS

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Truro Gas Company and the Electric Light.

Presiding at the annual meeting of the Truro Gas Company, Mr. John James, the Chairman, referred to the anxiety which had been caused by strikes during the past year, and said it was a matter for congratulation that not a single customer who relied upon the Company for lighting, heat, or power had suffered the least inconvenience or curtailment of supply. He had hoped to be able to announce at the meeting a reduction in the price of gas, but they were faced with such increases in the cost of coal and freights and of other things, that this must be deferred. The average cost of coal last year had been 8d. per ton more than in the previous year; and as to the future, the price had increased by an amount which represented 6d. per 1000 cubic feet of gas sold. Other materials had also risen in price. The business of the Company continued to increase. Plant had been laid down for dehydrating tar. It was the Directors' intention to apply for a Provisional Order enabling them to supply electricity in the city. It was absolutely certain that electricity could not be profitably supplied in Truro, but there were people who had a preference for electric light, and there was no valid reason why they should not be supplied with it, if they were willing to pay. The Company could supply it at a more favourable rate than any independent undertaking. It had been urged that the city would be better served if there was a rival company; but it was a novel idea to suggest that the surest way of cheapening gas was to reduce the demand for it. In many districts in England gas would be sold at a much cheaper rate were it not for the unreasonable competition of rival forms of light. He ventured to suggest that the City Council should support the application of the Gas Company, which they could do while seeing that the rights and interests of the citizens were guarded by clauses in the Order as to price, &c. The report and balance-sheet, which showed that there was a balance of £2187 to the credit of the profit and loss account, were adopted; and it was decided to pay a dividend of 5 per cent. and carry forward the balance of £280. A vote of thanks was passed to Mr. S. J. Ingram (the Manager), Mr. W. H. Sainsbury (Secretary), and the rest of the staff. At a meeting of the City Council last week it was decided to engage the services of an expert to advise the Council with reference to the various applications for powers to supply electricity in the city. The Mayor (Mr. W. G. Goodfellow) said he had come to the conclusion that such matters as the supply of water and light ought to be under municipal control, and the present movement might lead them somewhere in this direction.

Public Lighting of Cobham.—The Epsom Rural District Council have, as the result of an interview between their Clerk and the Chairman of the Leatherhead Gas Company, come to a satisfactory settlement with regard to the wording of the agreement dealing with the public lighting of Cobham; and the Cobham Parish Council have approved of the arrangement. This hitch having been overcome, the work of fitting-up the lamps was at once resumed.

The Fatality at the Mossley Gas-Works.—After lingering just a fortnight, John Wright, who was injured in the explosion at the Mossley Gas-Works, died at the Ashton-under-Lyne Infirmary on the 11th inst.; this making the third victim. When taken out of the gasholder after the explosion, Wright was found to be badly burnt about the face and body. Up to a few days before his death, however, hopes were entertained for his recovery. He was an employee of Messrs. Ashmore, Benson, Fease, and Co., who are carrying out repairs and alterations at the works, and was only 22 years of age. At the inquest last Friday, a verdict of "Accidental death" was returned, as in the case of the other two victims.

Winding-Up of the Brighton Crystal Water Company.—Under a winding-up order made in the Brighton Court against the Brighton, Eastbourne, and Bognor Crystal Water Company, Limited, of No. 5, Abchurch Yard, Cannon Street, E.C., late the Crystal Water-Works, of Bedford Street, Bognor, Sussex, accounts have now been issued showing liabilities amounting to £1626 5s. 11d., and assets estimated to realize £1222 18s. 4d. But these are more than absorbed by the claims of debenture-holders. As regards the contributories, there is a total deficiency of £2526 5s. 11d. It would appear that the winding-up order was made on the petition of a creditor. The Company was incorporated in February last, to acquire and conduct the business of mineral-water manufacturers then carried on at Bognor by the Bognor Crystal Mineral Water Company. The Company was promoted by the vendors, the London Industrial Contract and Finance Syndicate, Limited, of 5, Abchurch Yard, E.C. The present position of the Company is stated to be due to the failure of the public to subscribe at the invitation issued in May, which was adversely commented upon in the "JOURNAL" at the time, and to pressure brought by the petitioning creditor.

Heywood Gas-Works Extensions.—The Town Clerk of Heywood has received notification from the Local Government Board that the Corporation's recent application for a loan in connection with extensions and alterations at the gas-works has been granted. The scheme is estimated to cost altogether £12,000, of which £9000 is for the contract of the West Gas Improvement Company, Limited, for an installation of Glover-West vertical retorts; the carbonizing plant when finished to be equal to 500,000 cubic feet per day. In addition, there is an estimated expenditure of £500 in connection with pipes and the alteration of the retort-house; and other expenditure to be provided for out of the loan includes £1500 for prepayment meters and £1000 for mains. At the monthly meeting of the Town Council, Mr. D. Healey, in moving the confirmation of the Gas Committee's proceedings, explained that, with regard to the carbonizing plant, the department had been granted £9600 only, so that the Committee would have to take £800 out of revenue. They asked for £1000 for new mains, and had been granted £600. On general items they had obtained sanction to borrow £600 less than the sum wanted, which made the total to be taken out of revenue account £1800. There was no discussion.

A DIFFICULTY OVERCOME

A vast number of your consumers have objected to the use of gas fires on account of the unsightly gap between top of fire and grate canopy, when fitted in front of an existing coal grate. The Introduction of

A PATENT ADJUSTABLE CORNICE FIRE

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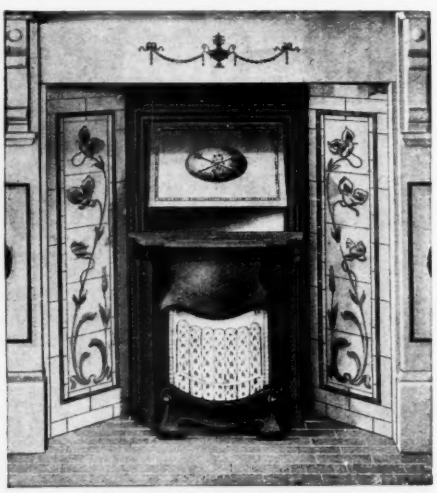
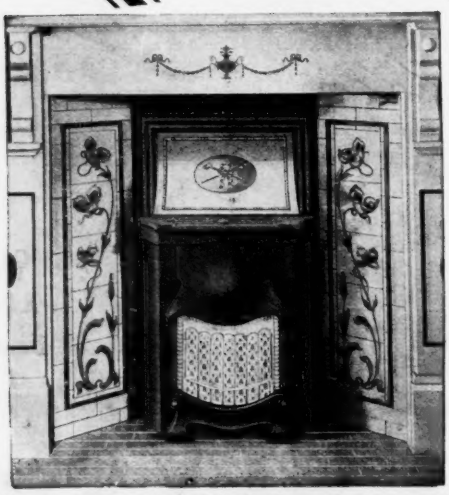
abolishes this difficulty, as it will

ACCURATELY FIT UNDER EXISTING GRATE CANOPIES.



Before Cornice is adjusted (showing an unsightly gap).



After Cornice is adjusted (note the neat appearance).

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PATENT LOCKING FUEL GUARD.

10-inch Fire Opening.

Prices from **26**s. **6**d.

THE PARKINSON STOVE COMPANY, LTD.,

BIRMINGHAM & LONDON.

Lewes Gas Company.—Addressing the shareholders at the half-yearly meeting of the Lewes Gas Company, the Chairman (Mr. M. S. Blaker) said the proceeds from the sale of gas were slightly less than for the corresponding half of the previous year; but the gas was 2d. per 1000 cubic feet cheaper now than in a portion of the 1911 half year. The Company had 970 ordinary consumers, and 1358 users of prepayment meters. After carrying out the public lighting ever since the Company was established some eighty years ago, the Corporation had now decided to divide the lighting of the streets between the Gas Company and the Electric Light Company. The Gas Company had, he thought, given satisfaction in the past; and when winter arrived people would be able to form their own opinion as to which was the better form of illuminant. The coal strike had caused the Directors great anxiety; but they had, with the efficient aid of the Manager (Mr. E. Jones) been able to maintain the supply of gas, and tide over the difficult time without having to purchase more than a very small quantity of coal at an advanced price. Dividends for the half year were declared at the rate of 5 per cent. upon the original capital stock, and 3½ per cent. upon the additional capital stock.

The annual church parade of the St. John Ambulance Brigade (Prince of Wales' Corps), South Metropolitan Gas Company's Division, took place last Sunday; the service being held at St. Clement's Church, Friern Road, East Dulwich. With a few members from other brigades, there was altogether a muster of over 300. The South Metropolitan Gas Company's military band and the bugle band of the Prince of Wales' Corps were in attendance. The Chief Engineer of the Company (Mr. W. Doig Gibb) and family, with many of the principal officers, were present, as also was the Mayor of Camberwell, supported by a number of Aldermen and members of the Borough Council, in full state. The sermon was preached by the Ven. S. M. Taylor, M.A., Archdeacon of Southwark and Rector of St. Saviour's Cathedral Church.

APPLICATIONS FOR LETTERS PATENT.

20,005.—Lovett, J., "Air-gas machines." Sept. 2.
20,036.—Burnside, G. B., "Supporting mantles." Sept. 3.
20,060.—Akt.-Ges. Brown, Boveri, et Cie., "Gas-turbines." Sept. 3.
20,067.—Redfern, C. G., "Gas-producers." A communication from H. A. & C. H. A. Stuart. Sept. 3.
20,082.—Cloudsley, J. L., "Internal combustion engines." Sept. 3.
20,130.—Milne, J. R., and Cowan, J., "Governor," Sept. 4.
20,152.—Dinnis, A., "Gas-regulator." Sept. 4.
20,189.—Atkinson, A. H. & H. W., "Gas-meters." Sept. 4.
20,234.—Couch, T.W., "Gas-fittings." Sept. 5.
20,260.—Halpern, A., and Pospichil, E., "Pyrophorous gas-lighting apparatus and automatic means for cutting off the gas supply." Sept. 5.
20,320.—Mitchell, A., "Taps or cocks." Sept. 6.
20,322.—Lawton, W. A., "Gas and other heating and cooking stoves." Sept. 6.
20,385.—Seppel, B., and Dracke, H, "Coal-conveyers." Sept. 7.
20,392.—Cowper-Coles, S. O., "Lamps." Sept. 7.
20,393.—Cleary, F. G., "Gas cocks and valves." Sept. 7.

The Eastbourne Gas Company have decided to extend their mains to Westham and Pevensey Bay, and also to lay a supplementary 12-inch main to Hampden Park, owing to the increase in the gas consumption in this rapidly growing district. Messrs. A. H. Ball and Co., Limited, of Farnham, are carrying out the work.

In connection with the failure of the electric light in North London on Monday night last week, to which reference is made elsewhere, it may be mentioned that the greater part of the fashionable district of Paris was thrown into darkness on Sunday, the 25th ult., by the failure of a feeder cable in the Clichy section. All the large hotels, cafés, and restaurants on the Champs Elysée quarter were affected.

GAS COMPANIES' STOCK AND SHARE LIST.

Business continued very quiet on the Stock Exchange last week, apart from the fortnightly settlement, which was fairly large. One failure was reported; but it had no far-reaching effects. The general tendency was pretty good, considering that factors were mostly adverse. There was quite enough playing with fire in that powder magazine, the Near East, to give rise to apprehension; and gold movements outwards were on a scale that made money very tight, to the detriment of the gilt-edged division. Railways, too, did not show as much backbone as might have been looked for. During half the week the Jewish New Year festival was responsible for many absentees. The opening day was inactive, and movements were mostly on a small scale, but for the worse. Government issues were weak, and sales depressed Consols ⅛. Railways oscillated—ups and downs being about balanced. Americans were, however, all lower. Tuesday was bad for the gilt-edged securities on gold alarms, and Consols fell ¼. But elsewhere things were better; Railways being among them. The settlement began on Wednesday, and the tone was fairly cheerful. Consols were giving way when the Midlothian result recalled them. Rails were healthier, and scored some nice advances. On Thursday, Consols had another relapse and touched 73$\frac{15}{16}$, but finally closed unchanged. Rails were firm; but Americans were depressed. On Friday, everything unconnected with the settlement was quiet; but the tone was cheerful in spite of the usual Friday sales. Consols recovered ⅛; but Rails were irregular. The favourable tendency continued through Saturday. Consols advanced another ⅛, closing at 74⅛ to 74⅜, and Rails were quiet and firm. In the Money Market, there was a reduced demand for short loans; but discount rates steadily hardened, and closed very firm. Business in the Gas Market was at low pressure—certainly one of the quietest weeks of the season—and such transactions as there were effected were confined to a restricted range of securities. However, the market showed undiminished strength; and the few variations made in quotations were all for the better. In Gaslight and Coke issues, the ordinary was only moderately dealt in, but at very firm and close prices—nothing ranging outside the limits of 106 to 106½. In the secured issues, the maximum realized 83 and 83½, the preference 99 and 100, and the debenture 76 and 76¼. A few transactions in South Metropolitan were marked at 116½ to 117¼; and the debenture made 78½. Nothing was done in Commercials. Among the Suburban and Provincial group, Alliance and Dublin changed hands at 79 (a rise of 3), British at 45⅜ and 45½, Bournemouth "B" at 16 and 16¼, North Middlesex at 14½, and South Suburban at 120¼. Hastings, Ilford, and Tynemouth rose without business marked. In the Continental companies, Imperial was done at 180 to 183, Union at 84½ and 85, and European at 19½ and 19⅝. Among the undertakings of the remoter world, Bombay made 6$\frac{9}{16}$ (a rise of ¼), Buenos Ayres debenture 94, Primitiva from 7⅛ to 7$\frac{5}{16}$, and ditto preference from 5¼ to 5$\frac{11}{32}$.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
1,551,868	Stk.	Apl. 12	5	Alliance & Dublin Ord.	78–83	+3	6 0 6
374,000	Stk.	July 12	4	Do. 4 p.c. Deb.	89–91	..	4 7 11
250,000	5	Apl. 12	7½	Bombay, Ltd.	6¼–6⅞	+¼	5 11 1
50,000	10	Aug. 29	15	Bourne-) 10 p.c.	28–29	..	5 3 5
332,000	10	"	7	mouth Gas) B 7 p.c.	14–14½	..	4 2 9
75,000	10	"	6	and Water) Pref. 6 p.c.	255–260	..	5 3 10
380,000	Stk.	Aug. 14	13½	Brentford Consolidated	195–200	..	5 5 0
330,000	"	"	10½	Do. New	116–118	..	4 4 9
50,000	"	"	5	Do. 5 p.c. Pref.	95–97	..	4 2 6
206,250	"	June 14	4	Do. 4 p.c. Deb.	210–215	..	5 2 4
218,230	Stk.	Aug. 29	11	Brighton & Hove Orig.	152–155	..	5 3 3
244,200	"	"	8	Do. A Ord. Stk.	44½–45½	..	5 9 11
530,000	20	Mar. 28	12½	British	91–93	..	4 6 0
120,000	Stk.	June 28	4	Do. 4 p.c. Deb. Stk.	93–95	..	4 4 3
250,000	Stk.	June 28	4	Buenos Ayres 4 p.c. Deb.	2–3	..	—
100,000	10	—	—	Cape Town & Dis., Ltd.	3½–4½	..	—
100,000	10	—	—	Do. 4½ p.c. Pref.	74–78	..	5 15 5
100,000	Stk.	June 28	4½	Do. 4½ p.c. Deb. Stk.	107½–109½	..	4 11 4
157,150	Stk.	Aug. 29	5	Chester 5 p.c. Ord.	105–107	..	5 2 1
1,513,280	Stk.	Aug. 29	5/9/4	Commercial 4 p.c. Stk.	103–102	..	5 4 5
560,000	"	"	5½	Do. 3½ p.c. do.	73–75	..	4 0 0
475,000	"	June 14	3	Do. 3 p.c. Deb. Stk.	133–135	..	5 3 8
800,000	Stk.	May 31	4	Continental Union, Ltd.	133–135	..	5 3 8
200,000	"	"	7	Do. 7 p.c. Pref.	123–124	..	4 8 9
492,270	Stk.	—	5½	Derby Con. Stk.	103–105	..	3 16 2
55,000	"	—	4	Do. Deb. Stk.	19–20	..	5 0 0
1,002,180	10	July 26	10	European, Ltd.	105–107	..	4 11 0
16,160,600	Stk.	Aug. 14	4/17/4	Gas-) 4 p.c. Ord.	81–84	..	4 3 4
2,600,000	"	"	3½	light) 3½ p.c. max.	98–100	..	4 0 0
4,062,235	"	"	4	and) 4 p.c. Con. Pref.	75–77	..	3 17 11
4,531,705	"	June 14	3	Coke) 3 p.c. Con. Deb.	91–93*	+½	5 7 6
258,740	Stk.	Sept. 13	5	Hastings & St. L. 3½ p.c.	—	..	—
82,500	"	"	6½	Do. do. 5 p.c.	16½–17	..	6 9 5
70,000	10	Apl. 26	11	Hongkong & China, Ltd.	154–157*	+¾	4 17 1
131,000	Stk.	Sept. 13	7⅞	Ilford A and C	121–123*	+1¼	4 19 7
65,780	"	"	6⅛	Do. B	91–93	..	4 6 0
65,500	"	June 28	4	Do. 4 p.c. Deb.	178–183	..	4 18 4
4,940,050	Stk.	May 15	9	Imperial Continental	86–88	..	3 19 7
1,235,000	Stk.	Aug. 14	3½	Do. 3½ p.c. Deb. Red.	122–125	..	4 16 0
200,242	Stk.	Aug. 29	6	Lea Bridge Ord. 5 p.c.			

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
561,000	Stk.	Aug. 29	10	Liverpool United A.	211–213	..	4 13 11
718,100	"	"	7	Do. B.	152½–154½	..	4 10 7
306,083	"	June 28	4	Do. Deb. Stk.	100–102	..	3 18 5
63,180	Stk.	June 28	3	Maidstone 3 p.c. Deb.	66–68	..	4 8 3
75,000	5	June 14	6	Malta & Mediterranean	4⅜–4⅝	..	6 3 1
560,000	100	Apl. 1	5	Met. of) 5 p.c. Deb.	—	..	—
250,000	100	"	4½	Melbourne) 4½ p.c. Deb.	101–103	..	4 7 5
541,920	20	May 31	3½	Monte Video, Ltd.	11–11½	..	6 1 9
1,775,892	Stk.	July 26	4⅜	Newc'tle&G'tesh'd Con.	98½–99	..	4 8 5
529,705	Stk.	June 28	3½	Do. 3½ p.c. Deb.	84½–85¼	..	4 2 1
55,940	10	Aug. 29	7/7/0	North Middlesex 7 p.c.	13½–14½	..	5 1 4
300,000	Stk.	May 15	8	Oriental, Ltd.	134–136	..	5 17 8
60,000	5	Mar. 14	10†	Ottoman, Ltd.	8¼–8⅝	..	5 14 3
60,000	50	Aug. 14	13	Portsea Island B	127–130	..	5 0 0
100,000	50	"	12	Do. C	124–127	..	4 14 6
398,490	5	May 15	8	Primitiva Ord.	7⅛–7⅜	..	5 8 6
796,980	5	June 28	5	Do. 5 p.c. Pref.	5¼–5½	..	4 10 11
488,900	100	June 1	4	Do. 4 p.c. Deb.	96–98	..	4 1 8
312,650	Stk.	June 28	4	River Plate 4 p.c. Deb.	93–95	..	4 4 3
275,000	5	Apl. 12	12	San Paulo, Ltd.	13½–14½	..	4 2 9
150,000	10	"	6	Do. 6 p.c. Pref.	11½–12¼	..	4 18 0
125,000	50	July 1	5	Do. 5 p.c. Deb.	49–51	..	4 18 0
135,000	Stk.	Aug. 29	10	Sheffield A	229–231	..	4 6 7
209,984	"	"	10	Do. B	229–230	..	4 6 11
523,500	"	"	10	Do. C	228–230	..	4 6 11
90,000	10	May 31	7½	South African	8–9	..	8 6 8
6,429,895	Stk.	Aug. 29	5/9/4	South Met., 4 p.c. Ord.	116–118	..	4 12 8
1,895,445	"	July 12	3	Do. 3 p.c. Deb.	76–79	..	3 15 11
209,820	Stk.	Aug. 14	8½	South Shields Con. Stk.	155–157	..	5 8 3
605,000	Stk.	Aug. 14	5/16/8	S'th Suburb'n Ord. 5 p.c.	119–121	..	4 16 3
60,000	"	"	5	Do. 5 p.c. Pref.	116–118	..	4 4 9
117,058	"	July 12	5	Do. 5 p.c. Deb. Stk.	120–122	..	4 2 0
502,310	Stk.	May 15	5	Southampton Ord.	105–107	..	4 13 6
120,000	Stk.	Aug. 14	7½	Tottenham) A 5 p.c.	142–145	..	5 0 0
483,940	"	"	5½	and) B 3½ p.c.	114–116	..	4 19 2
149,470	"	June 28	4	Edmonton) 4 p.c. Deb.	94–96	..	4 3 4
182,380	10	June 15	5	Tuscan, Ltd.	8⅛–8⅝	..	5 15 11
149,900	10	July 1	5	Do. 5 p.c. Deb. Red.	97–99	..	5 1 0
236,476	Stk.	Aug. 14	5	Tynemouth, 5 p.c. max.	112–114	+2	4 7 9
255,636	Stk.	Aug. 29	6⅞	Wands-) B 3½ p.c.	133–141	..	4 17 6
85,766	"	June 28	3	worth) 3 p.c. Deb. Stk.	70–72	..	4 3 4

Prices Marked * are "Ex. Div." † Next dividend will be at this rate.

The Directors of the Bombay Gas Company, Limited, have declared an interim dividend of 3 per cent. for the six months ended the 30th of June last.

The Derby Gas Company have placed with Messrs. Ed. Bennis and Co., Limited, of Little Hulton, Bolton, an order for mechanical stokers and self-cleaning compressed air-furnaces for the Litchurch Gas-Works.

Messrs. John Riley and Sons, Limited, has been registered with a capital of £100,000, in £10 shares (3000 preference), to carry on the business of chemical manufacturers at the Chemical and Copper Works, Hapton, near Accrington.

At the monthly meeting of the Accrington and District Gas and Water Board last Thursday, it was resolved that application be made to the Local Government Board for sanction to borrow £11,000 for extensions at the Great Harwood Gas-Works, including an installation of mechanical stokers, coal elevators, crushers and conveyors.

Messrs. James Joicey and Co., owners of the South Tanfield Colliery, at Oxhill, near Stanley, Durham, have decided to close-down this pit at the end of the present year. The mine is a very old one, having been sunk about the year 1838, and the seams are now getting worked out.

The Carlisle Gas Committee have instructed the Engineer (Mr. H. E. Bloor) to make arrangements for the inspection and regulation of the various gas-stoves in use, with the approval of the respective householders—all materials supplied to be charged for. An inspector is to be appointed for the purpose.

The Main Roads Committee of the Lancashire County Council have secured the services of Mr. Halliwell, Inspector to the Ribble Joint Committee, Preston, to assist in an expert examination which is to be made to ascertain what damage, if any, is being done to the streams of the county through the tar-spraying and tar macadamizing of the roads.

WANTED, FOR SALE, CONTRACTS, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Appointments, &c., Vacant.

LADY DEMONSTRATOR. No. 5624.
GENERAL FOREMAN. No. 5626.
MAIN AND SERVICE LAYER. No. 5630.
REPRESENTATIVE. No. 5629.

Appointments, &c., Wanted.

GAS-WORKS FOREMAN. No. 5628.
LEADBURNER, &c. Masonic, 118, Galloway Road, Shepherd's Bush.
POSITION BY SWISS GAS ENGINEER. Rudolf Mosse, Zurich.

Plant, &c. (Second-Hand), Wanted.

AIR COMPRESSOR (PORTABLE). No. 5627.

Plant, &c. (Second-Hand), for Sale.

AERIAL ROPEWAYS, STEAM AND PETROL ENGINES, Mottram, Sheffield.
HIGH-PRESSURE GAS COMPRESSOR AND FITTINGS. Boots Cash Chemists, Nottingham.
LAMP COLUMNS AND LANTERNS. Barnsley Gas Company.
SCRUBBER-WASHER, &c. Redditch Gas-Works.

Meeting.

BRITISH GASLIGHT COMPANY. London Office. Wednesday, Sept. 25. Twelve o'clock.

Stocks and Shares.

BROADSTAIRS GAS COMPANY. By Auction. London Mart. Oct. 8.
DUNSTABLE GAS AND WATER COMPANY. By Auction. London Mart. Oct. 8.
SOUTHEND WATER COMPANY. By Auction. London Mart. Oct. 8.
TENDRING HUNDRED WATER COMPANY. By Auction. London Mart. Oct. 8.

TENDERS FOR

Borehole Sinking and Pumping Plant, &c.

BARNOLDSWICK GAS AND WATER DEPARTMENT. Tenders by Sept. 23.

Coal.

RIPON CORPORATION. Tenders by Sept. 23.

Coke.

WANDSWORTH AND PUTNEY GAS COMPANY. Tender by Sept. 30.

Gasholder and Tank.

MALVERN URBAN DISTRICT COUNCIL. Tenders by Sept. 27.

Sulphuric Acid.

MARKET HARBOROUGH GAS DEPARTMENT. Tenders by Sept. 21.

Tar.

MARKET HARBOROUGH GAS DEPARTMENT. Tenders by Sept. 21.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or stoppages of, PERMANENT ADVERTISEMENTS should be received by the FIRST POST on SATURDAY.

Wanted, For Sale, and Tender Advertisements, Six Lines and under, 3s.; each additional Line, 6d.

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